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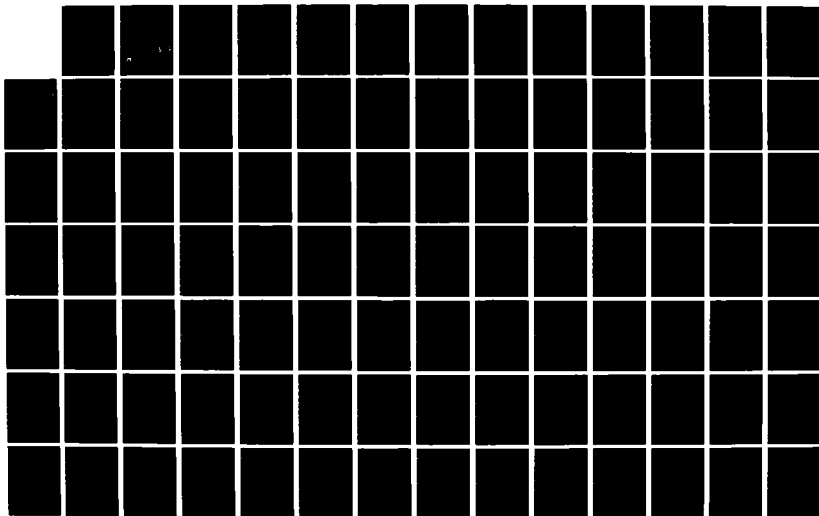
ANALYSIS OF FLUID FLOW AT VERY HIGH REYNOLDS NUMBER
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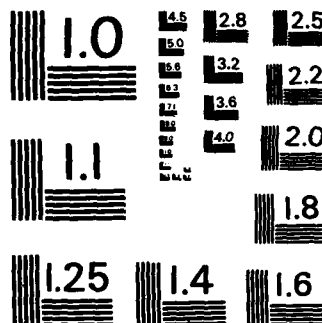
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FINAL REPORT

ANALYSIS OF FLUID FLOW
AT
VERY HIGH REYNOLDS NUMBER
AROUND SMOOTH & ROUGH CIRCULAR CYLINDERS

PREPARED FOR
OFFICE OF NAVAL RESEARCH

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ANALYSIS OF FLUID FLOW
AT
VERY HIGH REYNOLDS NUMBER
AROUND SMOOTH & ROUGH CIRCULAR CYLINDERS

PREPARED BY

S. S. R. Murty & M. C. George
Alabama A&M University

and

Bill Shih
Physical Research Inc.

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TABLE OF CONTENTS

	Page Number
Abstract	
Introduction	1
Discussion of Steady Pressure Measurements	2
Experimental Arrangements and Instrumentation	3
Experimental Results	5
References	11
Appendix	
A - Examples of Least Square Fit Computer Program Results and Plots	
B - Steady Pressure Data for Rough and Smooth Cylinders	
C - Boundary Layer Profiles and Data	

ABSTRACT

This final report prepared for Contract No. N00015-83-K-0351 and is submitted to the Office of Naval Research as required by the terms of the research contract. This has been a follow up of ONR contract No. N00014-81-K-0479 the final report of which was submitted to ONR in 1983. The experimental data collected under the above referenced contract has been interpreted and analyzed through the present effort. The results of the analysis are presented in the form of several graphs sequentially identified in this document.

Part 1 of this report is the analysis of steady state pressure measurements which have been analyzed, and plotted by Alabama A&M University.

Part 2 of this report is analysis of boundary layer profiles which was conducted by Physical Research Inc.

DATA ON
ANALYSIS OF FLUID FLOW AROUND
ROUGH AND SMOOTH CIRCULAR CYLINDERS
AT VERY HIGH REYNOLDS NUMBER

INTRODUCTION:

→ Wind tunnel tests were performed in the 12-ft pressure wind tunnel at NASA Ames Research Center during the months of May and June 1982. The model is an instrumented circular cylinder of 31.65 cm (12.46 in) diameter. Surface roughness was varied using wire mesh screens. Steady pressures, unsteady pressures, and boundary layer profiles were measured in these tests.

The data pertaining to these experiments were summarized in ^(a previous) ~~one~~ Report. Number N00014-81-K-0479. The entire data, archived in the Learning Resources Center (LRC) at Alabama A&M University, can be accessed by contacting Alabama A&M University LRC at telephone number (205) 859-7475. The collected experimental data have been analyzed during the present contract period. The task of analyzing voluminous amount of data stored on magnetic tapes by NASA was divided between Alabama A&M University and Physical Research Inc. who has been a participating subcontractor. *The results of the analysis is*

> The steady pressure distributions have been analyzed by the prime contractor. The results of this analysis conducted by Alabama A&M University is given in Part 1 of this document. ^(d) The analysis of the boundary layer profiles was conducted by Physical Research Inc. and the corresponding plots are given in Part 2.

1

PART 1

1. Discussion of Steady Pressure Measurements

Flow past circular cylinders has been a challenging research area for the study of fundamental fluid dynamic behavior. The main parameters governing the rigid cylinder flow are the Reynolds number based on diameter, the relative surface roughness and the free stream Mach number. The various flow regimes as defined by Roshko are followed in this report. The subcritical regime is associated with the region for which Re is less than that at which minimum drag occurs. The critical regime refers to the region where the drag coefficient undergoes a sharp decrease towards the minimum. The supercritical regime is in the upper transition regime as the drag increases from its minimum value. Finally the transcritical regime is the region where the drag curve flattens out. The high Reynolds number regime that we consider in this work is the transcritical region.

The parameters of general interest for cylinder flow are the steady pressure coefficient C_p , drag coefficient C_D , unsteady lift coefficient $C_L(t)$, unsteady pressure coefficient $C_p(t)$, and the strouhal number S . In general, all of these parameters are functions of the Reynolds number Re , and relative roughness k/d . Free stream turbulence scale as well as intensity are important. Surface roughness has several interesting effects on the cylinder flow. Surface roughness affects the position of boundary layer separation and consequently the pressure coefficient on the cylinder. Roughness ahead of transition tends to move the transition forward, and roughness beneath the turbulent boundary layer changes the velocity profile. Increase in the roughness parameter k/d will modify the flow regimes by increasing the

minimum drag coefficient and by reducing the Reynolds number values which delineate the flow regimes.

The objectives of the present tests are to determine steady and unsteady flow properties on smooth and rough cylinders up to a Reynolds number of 8 million, and to investigate the Reynolds number independence regime for rough cylinders.

2. Experimental Arrangement and Instrumentation

The wind tunnel tests were conducted in the 12 foot pressure wind tunnel at NASA Ames Research Center during the months of May and June 1982. The operating characteristics of the wind tunnel are shown in Figure 1. The tests were conducted over a range of Reynolds numbers per foot of 0.2×10^6 to 7.5×10^6 at a Mach number range of 0 to 0.25, with most of the tests at $M=0.24$.

The model instrumented and tested is a circular cylinder with a diameter of 31.65 cm (12.46 in) machined from extra heavy, seamless "black" pipe. The ratio of surface roughness to model diameter is 1.85×10^{-6} . The model spanned the wind tunnel test section horizontally to obtain 2-dimensional flow. The instrumentation on the model consists of 18 static pressure ports evenly spaced at 20° intervals around the circumference near the middle of the cylinder as shown in Figure 2. The model is rotated at 5° increments through a total rotation of 20° . Values of static sectional drag and lift coefficients were obtained by appropriate integration of these pressure measurements. In addition to the circumferential ports in the middle there are 8 bands of static pressure ports located at sections A-1 to A-8 longitudinally. At each section, there are ports 4° , 64° and 124° when the roll angle of the model is zero degrees. The pressure measurements at these

ports provide information on the two-dimensionality of the flow over the span of the cylinder.

The unsteady pressure measurements are made using 12 kulite pressure transducers evenly spaced around the circumference near the model center. The unsteady data from these transducers will be used to study lift spectra and vortex shedding frequencies as the Reynolds number is varied.

The behavior of the boundary layer as the Reynolds number is varied is studied using the boundary layer probe shown in Figure 3.

Surface roughness is simulated by the use of three square mesh wire screens. Table I gives the details of the screens.

Table I
Wire Mesh Particulars for Roughness Simulation

<u>Wire Dia (in)</u>	<u>Mesh</u>	<u>% Open</u>	<u>K/D</u>
0.0016	250	36	3×10^{-4}
0.0065	60	37.5	1×10^{-3}
0.063	6	38.9	1×10^{-2}

The screens were attached in two 36 inch long end sections and one 30 inch long center section.

3. Experimental Results

(a) Static Pressure Distributions

The nature of the flow around the circular cylinder and the variation of drag and lift coefficients generated by the flow are indicated by the changes in the static pressure coefficient C_p as the angular position around the cylinder and the Reynolds number are varied. Typical C_p variations are shown in Figure 4 as the Reynolds number is varied from 0.2×10^6 to 7.5×10^6 for smooth cylinder.

(b) Comment on data

Experimental points corresponding to ports 3, 6 and 11 were exhibiting unreasonable scatter for a number of runs. These points have been selectively edited and are not shown in the pressure plots.

(c) Calculation of drag and lift coefficients

The drag and lift coefficients are calculated from the following relations.

$$C_D = \frac{1}{2} \int_0^{2\pi} C_p \cos \theta \, d\theta \quad (1)$$

$$C_L = \frac{1}{2} \int_0^{2\pi} C_p \sin \theta \, d\theta \quad (2)$$

The integrations in eq(1) and (2) are performed using a least squares fit to the experimental points. In other words, C_p was expressed

$$C_p = a\theta^3 + b\theta^2 + c\theta + d \quad (3)$$

and the coefficients a , b , c , d were obtained from the computer program listed in appendix A. The program fits 1st degree, 2nd degree and 3rd degree curves and calculates the mean r.m.s. deviation from the experimental points. The curve that has the least r.m.s. deviation is then chosen to calculate the C_D

and C_L coefficients. After several trials, it was decided to divide each C_p versus θ curve into seven sections and compute the least square fit and C_L , C_D values for each of the seven sections, and add them up. Typical least square fits are shown in Appendix A.

The run particulars, C_L and C_D values are displayed in the top portion for all the static pressure runs.

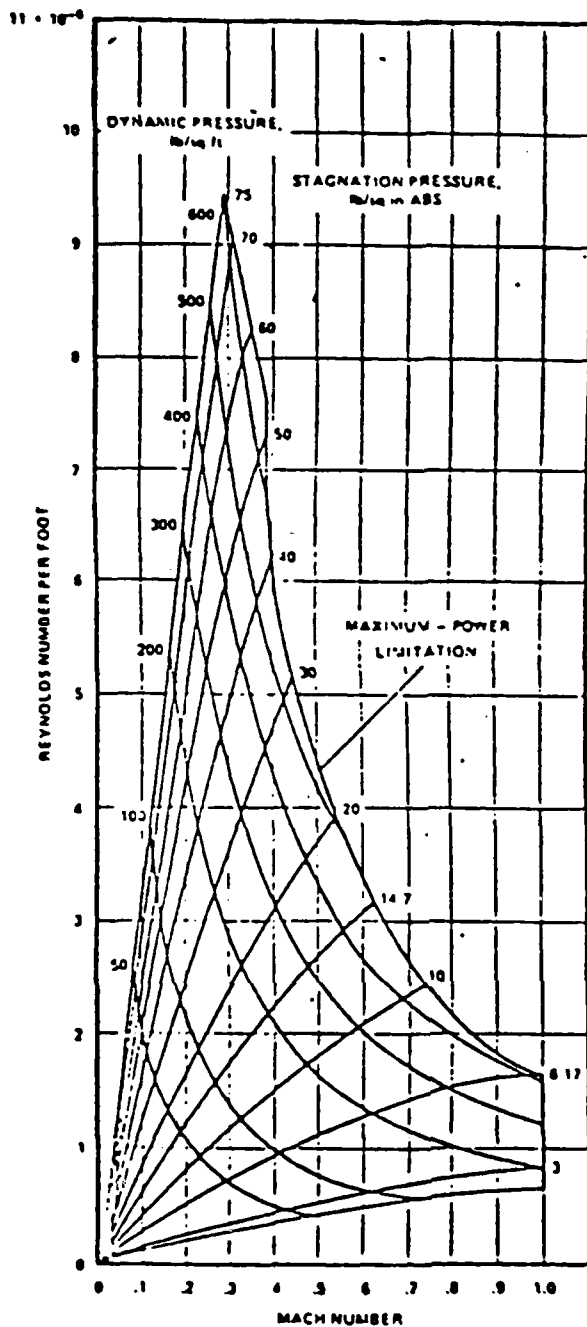


FIGURE 1. NASA TWELVE FOOT PRESSURE WIND TUNNEL OPERATING MAP

20.01	0.1712
24.98	0.2659
30.03	0.0574
34.97	-0.1466
40.14	-0.3600
40.01	-0.3547
44.98	-0.5599
50.03	-0.7684

COS IS 0.12857

SIN IS -0.01105

BETA IS 0.01841

FOR DEGREE OF 2 COEFFICIENTS ARE

0.10825E 01 -0.14435E-01 -0.53343E-03

0.02	1.0822
4.98	0.9974
10.03	0.8840
14.97	0.7468
20.14	0.5754
20.01	0.5800
24.98	0.3890
30.03	0.1679
34.97	-0.0747
40.14	-0.3564
40.01	-0.3490
44.98	-0.6461
50.03	-0.9749

COS IS 0.13409

SIN IS -0.00818

BETA IS 0.00366

FOR DEGREE OF 3 COEFFICIENTS ARE

0.10035E 01 0.95950E-02 -0.17938E-02 0.16946E-04

0.02	1.0037
4.98	1.0089
10.03	0.9364
14.97	0.8020
20.14	0.6076
20.01	0.6130
24.98	0.3880
30.03	0.1329
34.97	-0.1299
40.14	-0.4056
40.01	-0.3988
44.98	-0.6520
50.03	-0.8843

COS IS 0.13506

SIN IS -0.00924

BETA IS 0.00056

```

336      SUM2=115
337      ENDIF
338      IF(I.EQ.2) THEN
339          SUM1=TT5
340      ENDIF
341      GO CONTINUE

C
342      ALPHA=SUM2-SUM1
343      PRINT ' '
344      PRINT 66,ALPHA
345      66 FORMAT(9X,' SIN IS '.F10.5)
346      IF(J.EQ.2) THEN
347          CL3=CL3+ALPHA
348      ENDIF
349      IF(J.EQ.3) THEN
350          CL2=CL2+ALPHA
351      ENDIF
352      IF(J.EQ.4) THEN
353          CL=CL+ALPHA
354      ENDIF
355      IF(J.EQ.5) THEN
356          CL1=CL1+ALPHA
357      ENDIF
358      RETURN
359      END

```

```

/ DATA
COMPILE = 0.97 SU
RUN: SEQ
94:5
-----

```

SECTION--1

X	Y
0.02	1.0178
4.98	0.9957
10.03	0.9212
14.97	0.7979
20.14	0.6117
20.01	0.6202
24.98	0.3995
30.03	0.1502
34.97	-0.1226
40.14	-0.4605
40.01	-0.4036
44.98	-0.6230
50.03	-0.8828

0.130000E 02	0.335290E 03	0.116424E 05	0.451053E 06	0.186008E 08
0.302170E 01	0.335290E 03	0.116424E 05	0.451053E 06	0.186008E 08
0.798112E 09	-0.457259E 02	0.116424E 05	0.451053E 06	0.186008E 08
0.798112E 09	0.351963E 11	-0.383072E 04	0.451053E 06	0.186008E 08
0.798112E 09	0.351963E 11	0.158392E 13	-0.204129E 06	0.186008E 08
0.798112E 09	0.351963E 11	0.158392E 13	0.724167E 14	-0.996618E 07

FOR DEGREE OF 1 COEFFICIENTS ARE

0.12974E 01 -0.41291E-01

0.02	1.2966
4.98	1.0918
10.03	0.8833
14.97	0.6773
20.14	0.4658
20.01	0.4712
24.98	0.2659
30.03	0.0574
34.97	-0.1466
40.14	-0.3600
40.01	-0.3547
44.98	-0.5599
50.03	-0.7684

COS IS 0.12857

SIN IS -0.01105

BETA IS 0.01341


```

275      ALPHA=SUM2-SUM1
276      PRINT ' '
277      PRINT 66,ALPHA
278
279      66 FORMAT(9X,' COS IS ',F10.5)
280      IF(J.EQ.2)THEN
281          CE3=CE3+ALPHA
282      ENDIF
283      IF(J.EQ.3)THEN
284          CE2=CE2+ALPHA
285      ENDIF
286      IF(J.EQ.4)THEN
287          CE=CE+ALPHA
288      ENDIF
289      IF(J.EQ.5)THEN
290          CE1=CE1+ALPHA
291      ENDIF
292      RETURN
293      END

294      SUBROUTINE SINTEG(XF,XL,J,B1,CL,CL1,CL2,CL3)
295      REAL C1(100),B1(100)

296      C
297      C1(1)=B1(1)
298      DO 5 K=2,J
299          C1(K)=B1(K)*(57.3**(K-1))
300          5 CONTINUE

301      C
302      ALPHA=0.0
303      DO 10 I=1,2
304          IF(I.EQ.1)THEN
305              XF1=XL/57.3
306          ELSE
307              XF1=XF/57.3
308          ENDIF

309      C
310      T1=C1(1)*(-COS(XF1))
311      TB1=SIN(XF1)-(XF1*COS(XF1))
312      T2=T1+(C1(2)*TB1)
313      IF(J.EQ.2)THEN
314          TT5=0.5*T2
315      ELSE
316          TB2=(2.*XF1)*SIN(XF1)
317          TB3=TB2+((2.-(XF1**2))*COS(XF1))
318          T3=T2+(C1(3)*TB3)
319      ENDIF
320      IF(J.EQ.3)THEN
321          TT5=0.5*T3
322      ENDIF
323      IF((J.NE.2).AND.(J.NE.3))THEN
324          TB4=((3.*(XF1**2))-6.)*SIN(XF1)
325          TB5=TB4+(((6.*XF1)-(XF1**3))*COS(XF1))
326          T4=T3+(C1(4)*TB5)
327      ENDIF
328      IF(J.EQ.4)THEN
329          TT5=0.5*T4
330      ENDIF
331      IF(J.EQ.5)THEN
332          T5=((4.*(XF1**3))-(24.*XF1))*SIN(XF1)
333          T6=((XF1**4)-(12.*(XF1**2))+24.)*COS(XF1)
334          T7=(T5-T6)*C1(5)
335          T8=T4+T7
336          TT5=0.5*T8
337      ENDIF
338      IF(I.EQ.1)THEN

```

```

210      C
217      DO 40 J=2,N
218          NMJP2=N-J+2
219          NMJP1=N-J+1
220          SUM=0.0
221          DO 30 K=NMJP2,N
222              SUM=SUM+A(NMJP1,K)*B(K)
223      30  CONTINUE
224          B(NMJP1)=B(NMJP1)-SUM
225      40  CONTINUE
226      RETURN
227      END

228      SUBROUTINE CINTG(XF,XL,J,B1,CE,CE1,CE2,CE3)
229      REAL C1(100),B1(100)

230      C
231      C1(1)=B1(1)
232      DO 5 K=2,J
233          C1(K)=B1(K)*(57.3*(K-1))
234      5  CONTINUE

235      C
236      ALPHA=0.0
237      DO 10 I=1,2
238          IF(I.EQ.1)THEN
239              XF1=XL/57.3
240          ELSE
241              XF1=XF/57.3
242          ENDIF

243      C
244      T1=C1(1)*SIN(XF1)
245      TB1=COS(XF1)+(XF1*SIN(XF1))
246      T2=T1+(C1(2)*TB1)
247      IF(J.EQ.2)THEN
248          TT5=0.5*T2
249      ELSE
250          TB2=(2.*XF1)*COS(XF1)
251          TB3=TB2+(((XF1**2)-2.)*SIN(XF1))
252          T3=T2+(C1(3)*TB3)
253      ENDIF
254      IF(J.EQ.3)THEN
255          TT5=0.5*T3
256      ENDIF
257      IF((J.NE.2).AND.(J.NE.3))THEN
258          TB4=((3.*(XF1**2))-6.)*COS(XF1)
259          TB5=TB4+((XF1**3)-(6.*XF1))*SIN(XF1)
260          T4=T3+(C1(4)*TB5)
261      ENDIF
262      IF(J.EQ.4)THEN
263          TT5=0.5*T4
264      ENDIF
265      IF(J.EQ.5)THEN
266          T5=((XF1**4)-(12.*(XF1**2))+24.)*SIN(XF1)
267          T6=((4.*(XF1**3))-(24.*XF1))*COS(XF1)
268          T7=((T5+T6)*C1(5))
269          T8=T4+T7
270          TT5=0.5*T8
271      ENDIF
272      IF(I.EQ.1)THEN
273          SUM2=TT5
274      ENDIF
275      IF(I.EQ.2)THEN
276          SUM1=TT5
277      ENDIF
278      10  CONTINUE

279      C
280      ALPHA=SUM2-SUM1
281      PRINT ' '
282      PRINT 66,ALPHA
283      66  FORMAT(9X,' COS  IS ',F10.5)
284      IF(J.EQ.2)THEN
285          CE3=CE3+ALPHA
286      ENDIF
287      IF(J.EQ.3)THEN
288          CE2=CE2+ALPHA
289      ENDIF
290      IF(J.EQ.4)THEN
291          CE=CE+ALPHA
292      ENDIF
293      IF(J.EQ.5)THEN
294          CE1=CE1+ALPHA
295      ENDIF

```

```

165      CP(N1)=C(L)
166      56 CONTINUE
      C
      C
167      DO 55 K=1,N
168          FV=CP(1)
169          DO 49 J=2,I
170              49      FV=(FV*X(K))+CP(J)
171              PRINT 1,X(K),FV
172          55 CONTINUE
173      END BLOCK
174      END
      C

175      SUBROUTINE LUDCMQ(A,N,NDIM)
176      REAL A(NDIM,NDIM),SUM
177      INTEGER N,I,J,JM1,IM1,K
      C
178      DO 30 I=1,N
179          DO 30 J=2,N
180              SUM=0.0
181              IF(J.LE.I)THEN
182                  JM1=J-1
183                  DO 10 K=1,JM1
184                      SUM=SUM+A(I,K)*A(K,J)
185              10      CONTINUE
186                  A(I,J)=A(I,J)-SUM
187              ELSE
188                  IM1=I-1
189                  IF(IM1.NE.0)THEN
190                      DO 20 K=1,IM1
191                          SUM=SUM+A(I,K)*A(K,J)
192              20      CONTINUE
193                  ENDIF
      C
194              25      IF(ABS(A(I,I)).LT. 1.0E-10)THEN
195                  PRINT 100,I
196                  RETURN
197              ELSE
198                  A(I,J)=(A(I,J)-SUM)/A(I,I)
199              ENDIF
200          ENDIF
201      30 CONTINUE
202      RETURN
      C
203      100 FORMAT(' REDUCTION NOT COMPLETED BECAUSE SMALL VALUE',
1          ' FOUND FOR DIVISION IN ROW ',I3)
204      END
      C

205      SUBROUTINE SOLNQ(A,B,N,NDIM)
206      REAL A(NDIM,NDIM),B(NDIM),SUM
207      INTEGER N,I,IM1,K,J,NMJP1,NMJP2
      C
      C
208      B(1)=B(1)/A(1,1)
209      DO 20 I=2,N
210          IM1=I-1
211          SUM=0.0
212          DO 10 K=1,IM1
213              SUM=SUM+A(I,K)*B(K)
214      10      CONTINUE
215      B(I)=(B(I)-SUM)/A(I,I)

```

```

111      PRINT 201, ((A(1,J), J=1,MFP2), I=1,MFP1)
112      C
113      CALL LU0C0Q(A,MFP1,10)
114      C
115      MSP1=MS+1
116      DO 95 I=MSP1,MFP1
117          DO 90 J=1,I
118              C(J)=A(J,MFP2)
119          CONTINUE
120      CALL SOLNQ(A,C,I,10)
121      IM1=I-1
122      C
123      PRINT 202,IM1,(C(J),J=1,I)
124      PRINT ' '
125      EXECUTE COEF
126      C
127      DO 300 K=1,I
128          B1(K)=C(K)
129          CALL CINTG(XF,XL,I,B1,CE,CE1,CE2,CE3)
130          CALL SINTG(XF,XL,I,B1,CL,CL1,CL2,CL3)
131      C
132      PRINT ' '
133      BETA=0.0
134      DO 94 IPT =1,N
135          SUM=0.0
136          DO 93 ICOEF=2,I
137              JCOEF=I-ICOEF+2
138              SUM=(SUM+C(JCOEF))*X(IPT)
139          CONTINUE
140          SUM=SUM+C(1)
141          BETA=BETA+(Y(IPT)-SUM)**2
142      CONTINUE
143      BETA=BETA/(N-I)
144      PRINT 203,BETA
145      IF((KK.EQ.7).AND.(I.EQ.2))THEN
146          PRINT 301,CE3,CL3
147      ENDIF
148      IF((KK.EQ.7).AND.(I.EQ.3))THEN
149          PRINT 301,CE2,CL2
150      ENDIF
151      IF((KK.EQ.7).AND.(I.EQ.4))THEN
152          PRINT 301,CE,CL
153      ENDIF
154      301 FORMAT(//45X,' CD =',F10.5//'.45X,' CL =',F10.5)
155      IF((KK.EQ.7).AND.(I.EQ.5))THEN
156          PRINT 301,CE1,CL1
157      ENDIF
158      95 CONTINUE
159      C
160      C
161      999 CONTINUE
162      C
163      200 FORMAT(///' DEGREE OF POLYNOMIAL CANNOT EXCEED N - 1.'//
164          ' REQUESTED MAXIMUM DEGREE TOO LARGE - '
165          ' REDUCED TO ',I3)
166      201 FORMAT(5(3X,E13.6))
167      202 FORMAT(// ' FOR DEGREE OF ',I2,' COEFFICIENTS ARE'//
168          ' ',5X,6(2X,E12.5))
169      203 FORMAT(9X,' BETA IS ',F10.5//)
170      PRINT 299,ISEQ
171      299 FORMAT(////////'.35X,'END OF RUN:SEQ ',5A1////)
172      STOP
173      C
174      REMOTE BLOCK COEF
175      DO 66 L=1,I
176          N1=I-L+1
177          CP(N1)=C(L)
178      CONTINUE
179      C
180      DO 55 K=1,N
181          FV=CP(1)
182          DO 49 J=2,I
183              FV=(FV*X(K))+CP(J)
184          PRINT 1,X(K),FV
185      CONTINUE
186      END BLOCK
187      END
188      C
189      SUBROUTINE LU0C0Q(A,N,NDIM)

```

```

54      TEMP1=X(N)
55      TEMP2=Y(N)
56      ENDIF
57      IF(KK.NE.1)THEN
58          X(1)=TEMP1
59          Y(1)=TEMP2
60          DO 4 I=2,N
61      4      READ .K1,Y(I),K2,X(I)
62          TEMP1=X(N)
63          TEMP2=Y(N)
64      ENDIF
65      C
66      PRINT 1,(X(I),Y(I),I=1,N)
67      1 FORMAT(2X,F6.2,2X,F8.4)
68      C
69      IF(KK.EQ.1)THEN
70          XF=0.0
71          XL=X(N)
72      ELSE
73          XF=X(1)
74          XL=X(N)
75      ENDIF
76      C
77      IF(KK.EQ.7)THEN
78          XF=X(1)
79          XL=360.
80      ELSE
81          XL=X(N)
82      ENDIF
83      C
84      READ . MS,MF
85      C
86      IF(MF.GT.(N-1))THEN
87          MF=N-1
88          PRINT 200,MF
89      ENDIF
90      5 MFP1=MF+1
91      MFP2=MF+2
92      C
93      DO 10 I=1,N
94          XN(I)=1.0
95      10 CONTINUE
96      C
97      DO 30 I=1,MFP1
98          A(I,1)=0.0
99          A(I,MFP2)=0.0
100      DO 20 J=1,N
101          A(I,1)=A(I,1)+XN(J)
102          A(I,MFP2)=A(I,MFP2)+Y(J)*XN(J)
103          XN(J)=XN(J)*X(J)
104      20 CONTINUE
105      30 CONTINUE
106      C
107      DO 50 I=2,MFP1
108          A(MFP1,I)=0.0
109      DO 40 J=1,N
110          A(MFP1,I)=A(MFP1,I)+XN(J)
111          XN(J)=XN(J)*X(J)
112      40 CONTINUE
113      50 CONTINUE
114      C
115      DO 70 J=2,MFP1
116      DO 60 I=1,MF
117          A(I,J)=A(I+1,J-1)
118      60 CONTINUE
119      70 CONTINUE
120      C
121      PRINT 3,(A(I,J),I=1,MF,J=1,MFP1)

```

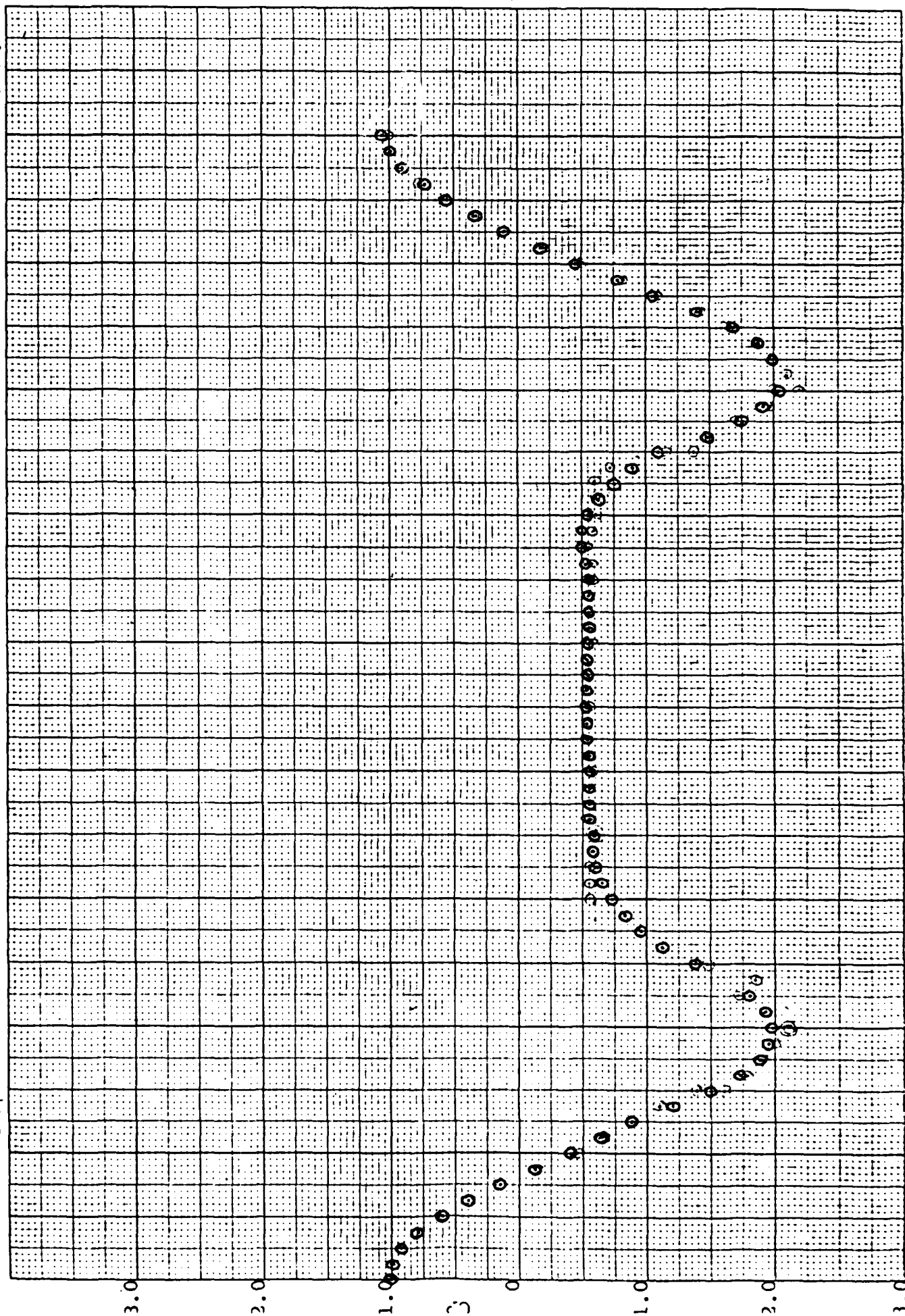
```

2      REAL X(100),Y(100),C(100),B1(100),A(10,11),XN(100),SUM,BETA
3      REAL CP(100),FV
4      INTEGER N,MS,MF,MFP1,MFP2,I,J,IM1,IFT,ICOEJ,JCOEF
5      CHARACTER*5 ISEQ
6      DATA MS/1/,MF/4/
7
8      C
9      C
10     C
11     PRINT , 'RUN:SEQ'
12     READ 11,ISEQ
13     11 FORMAT(5A1)
14     PRINT 11,ISEQ
15     PRINT , '-----'
16
17     C
18     CE=0.0
19     CL=0.0
20     CE1=0.0
21     CL1=0.0
22     CE2=0.0
23     CL2=0.0
24     CE3=0.0
25     CL3=0.0
26     DO 999 KK=1,7
27     PRINT 33
28     33 FORMAT('0')
29     IF(KK.EQ.1)THEN
30         PRINT , 'SECTION--1'
31         N=13
32     ENDIF
33
34     C
35     IF(KK.EQ.2)THEN
36         PRINT , 'SECTION--2'
37         N=12
38     ENDIF
39
40     C
41     IF(KK.EQ.3)THEN
42         PRINT , 'SECTION--3'
43         N=14
44     ENDIF
45
46     C
47     IF(KK.EQ.4)THEN
48         PRINT , 'SECTION--4'
49         N=21
50     ENDIF
51
52     C
53     IF(KK.EQ.5)THEN
54         PRINT , 'SECTION--5'
55         N=12
56     ENDIF
57
58     C
59     IF(KK.EQ.6)THEN
60         PRINT , 'SECTION--6'
61         N=11
62     ENDIF
63
64     C
65     IF(KK.EQ.7)THEN
66         PRINT , 'SECTION--7'
67         N=13
68     ENDIF
69
70     C
71     PRINT , ' X          Y'
72     IF(KK.EQ.1)THEN
73         DO 3 I=1,N
74             3 READ , K1,Y(I),K2,X(I)
75             TEMP1=X(N)
76             TEMP2=Y(N)
77         ENDIF
78         IF(KK.NE.1)THEN
79             X(1)=TEMP1
80             Y(1)=TEMP2
81             DO 4 I=2,N
82                 4 READ , K1,Y(I),K2,X(I)
83                 TEMP1=X(N)
84                 TEMP2=Y(N)
85             ENDIF
86
87             C
88             PRINT 1,(X(I),Y(I),I=1,N)
89             1 FORMAT(2X,F6.2,2X,F8.4)
90
91             C
92             IF(KK.EQ.1)THEN
93                 XF=0.0
94                 XL=X(N)
95             ELSE

```

RUN NO: 014

INITIALS: M.C.



APPENDIX A

EXAMPLES OF
LEAST SQUARE FIT COMPUTER PROGRAM
RESULTS AND PLOTS

REFERENCES

1. M. C. George, High Reynolds Number Cylinder Flow Studies, Dept. of Physics, Alabama A&M University, Normal, AL, 1982.
2. W. C. L. Shih, High Reynolds Number Cylinder Flow Workshop, Final Report, 17 August 1981, PRI-LA-81-R003, Physical Research Inc.
3. W. C. L. Shih, High Reynolds Number Cylinder Flow Tests Pretest Report, 20 April 1982, PRI-LA-82-R001, Physical Research Inc.
4. A. Roshko, Experiments on Flow Past a Circular Cylinder at Very High Reynolds Numbers, J. Fluid Mechanics, Vol. 10, pp. 345-356, 1961.

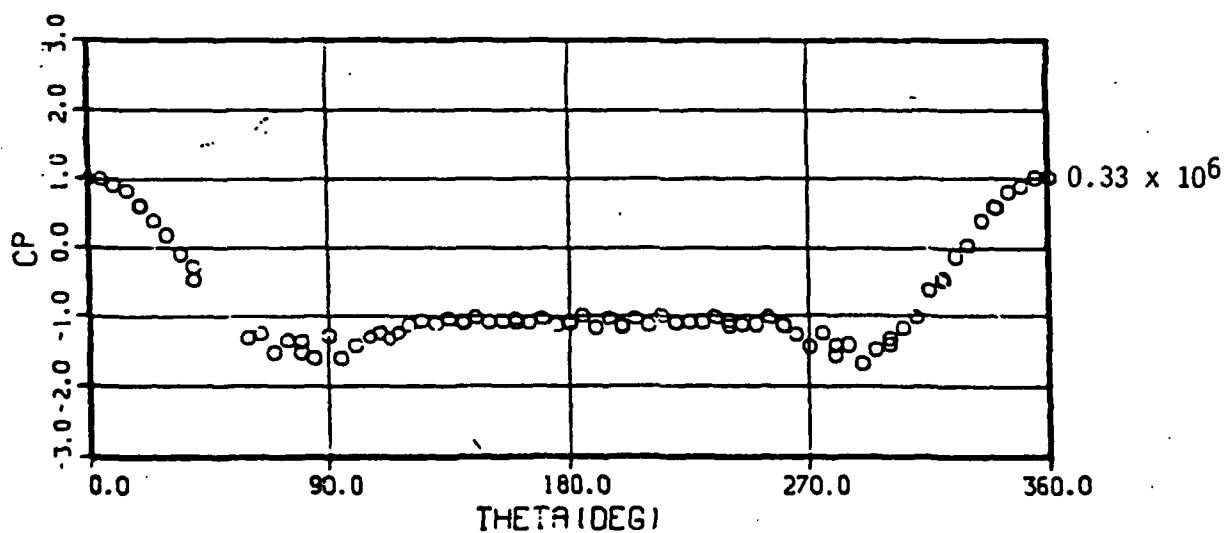
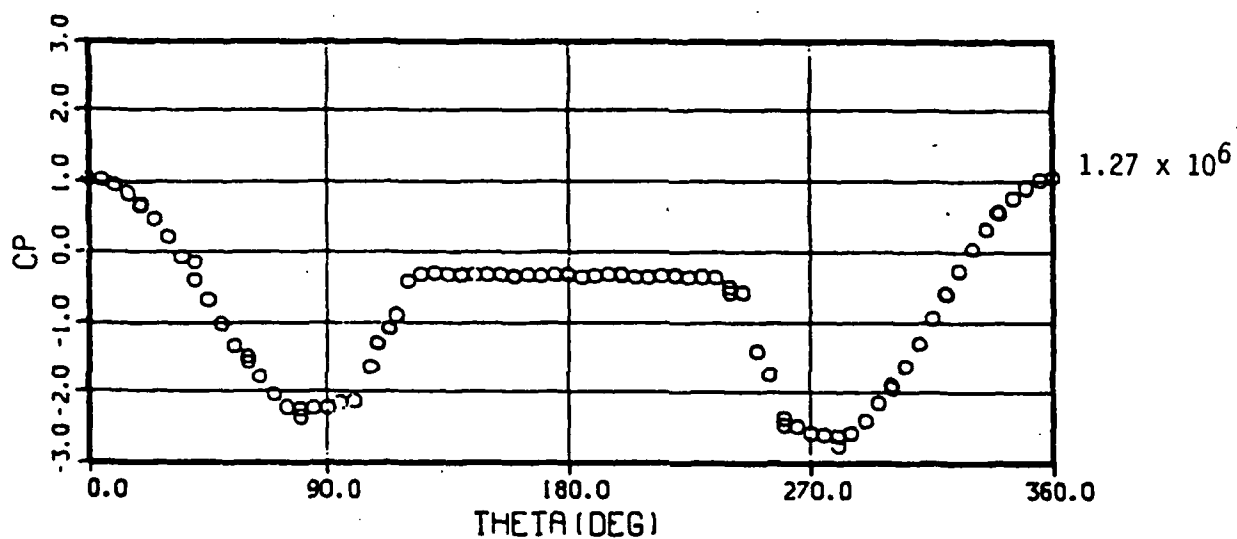
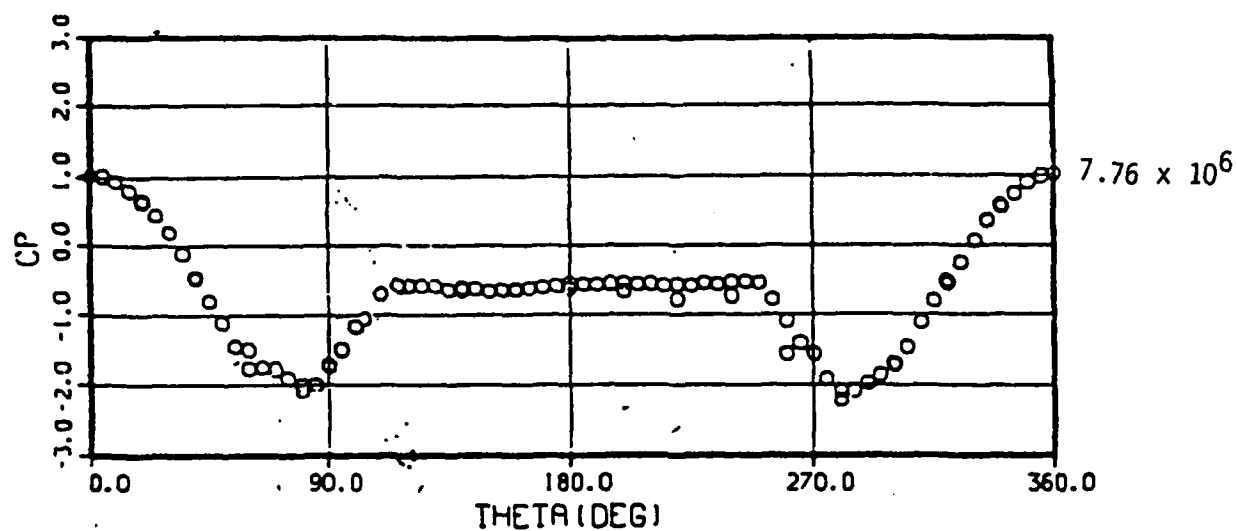


Figure 4. Typical changes in the pressure distribution over the smooth cylinder as Reynolds number is varied.

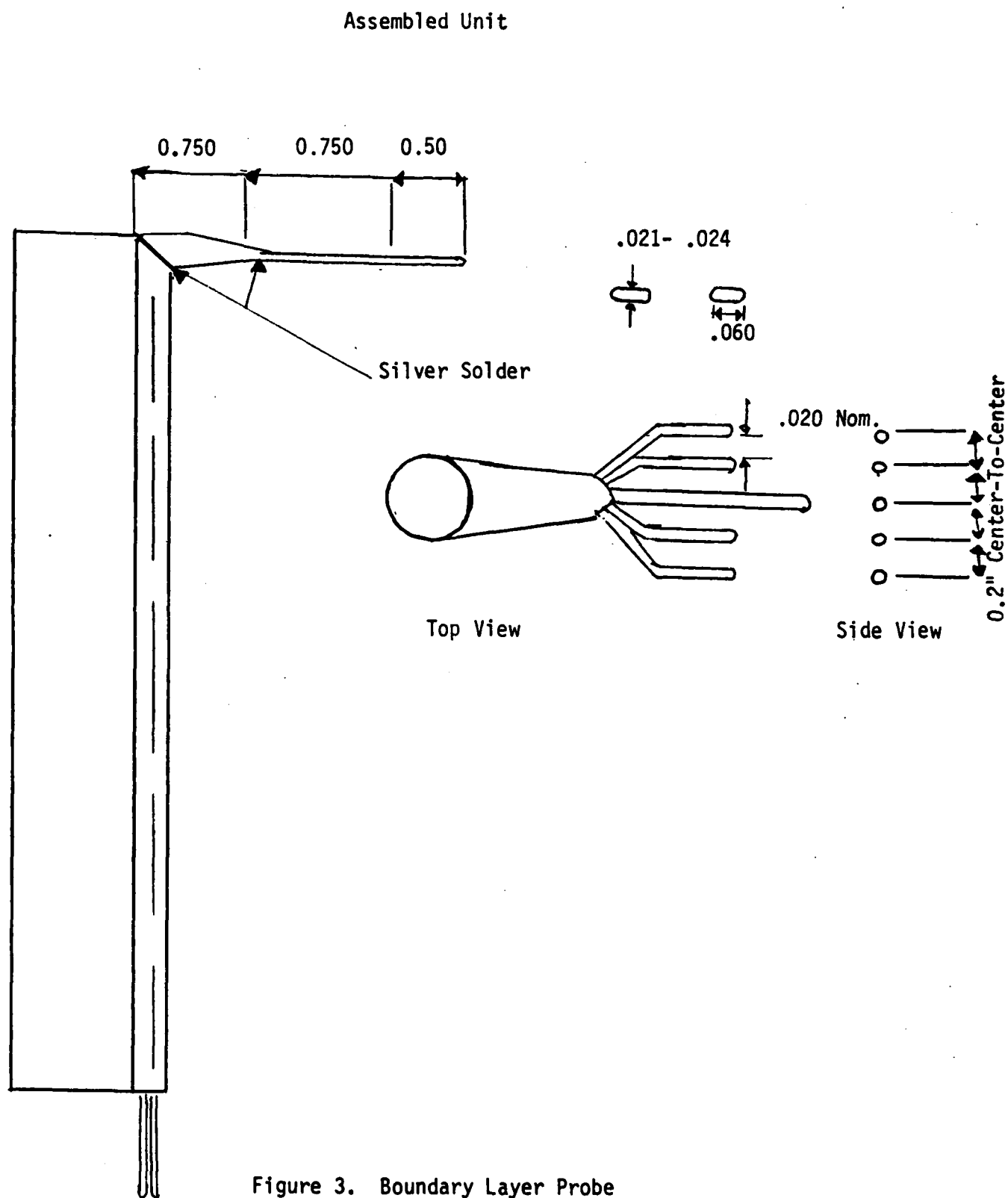


Figure 3. Boundary Layer Probe

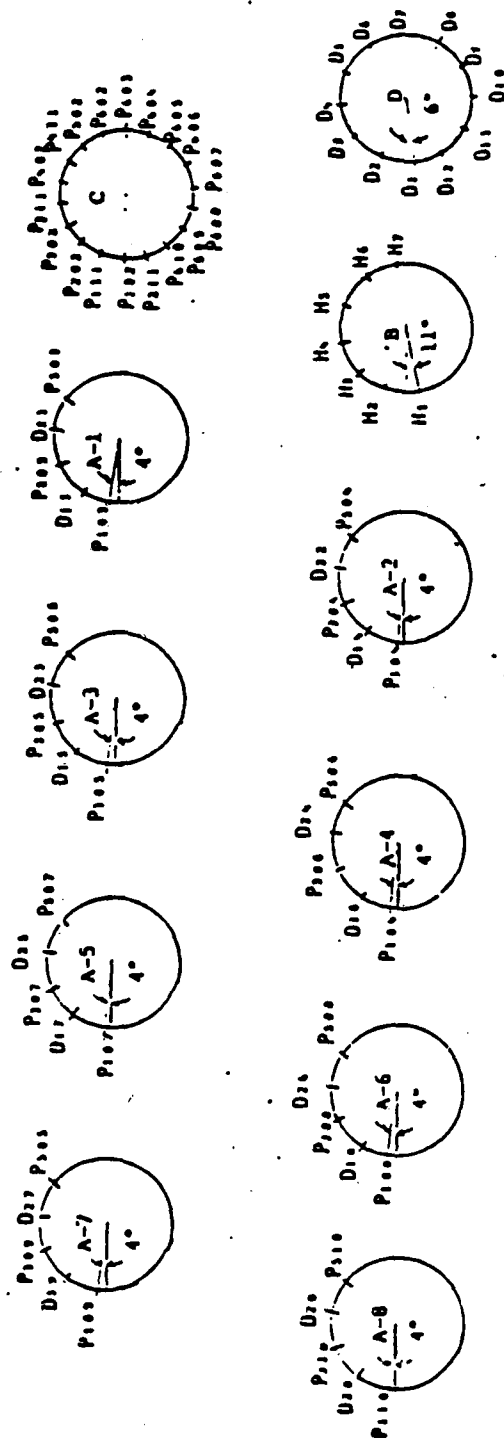
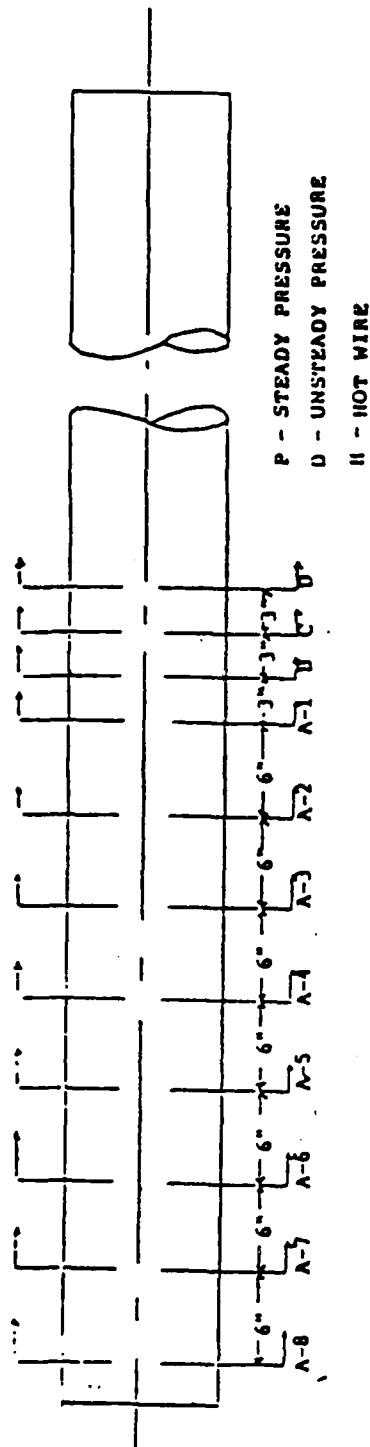


FIGURE 2. Model Instrumentation at 0 Degrees Roll Angle



FOR DEGREE OF 4 COEFFICIENTS ARE

0.10168E 01 0.84769E-03 -0.95523E-03 -0.91412E-05 0.25605E-06

0.02 1.0169
4.98 0.9964
10.03 0.9226
14.97 0.7977
20.14 0.6139
20.01 0.6191
24.98 0.3992
30.03 0.1416
34.97 -0.1297
40.14 -0.4147
40.01 -0.4077
44.98 -0.6614
50.03 -0.8722

COS IS 0.13440

SIN IS -0.00937

BETA IS 0.00048

SECTION--2

X Y
50.03 -0.8828
54.97 -1.1068
60.14 -1.3975
60.01 -1.6055
64.98 -1.7802
70.03 -1.9043
74.97 -1.9986
80.14 -1.9990
84.98 -1.9226
90.03 -1.7120
100.14 -1.4689
100.01 -1.3358

0.120000E 02	0.890429E 03	0.692692E 05	0.562675E 07	0.474613E 09
-0.191140E 02	0.890429E 03	0.692692E 05	0.562675E 07	0.474613E 09
0.413187E 11	-0.144267E 04	0.692692E 05	0.562675E 07	0.474613E 09
0.413187E 11	0.369112E 13	-0.113169E 06	0.562675E 07	0.474613E 09
0.413187E 11	0.369112E 13	0.336642E 15	-0.919925E 07	0.474613E 09
0.413187E 11	0.369112E 13	0.336642E 15	0.312140E 17	-0.771955E 09

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.10273E 01 -0.76215E-02

50.03 -1.4086
54.97 -1.4463
60.14 -1.4857
60.01 -1.4847
64.98 -1.5225
70.03 -1.5610
74.97 -1.5987
80.14 -1.6381
84.98 -1.6750
90.03 -1.7135
100.14 -1.7905
100.01 -1.7895

COS IS -0.16322

SIN IS -0.65558

BETA IS 0.12591

FOR DEGREE OF 2 COEFFICIENTS ARE

0.65178E 01 -0.21553E 00 0.13655E-02

50.03 -0.8473
54.97 -1.2038
60.14 -1.5054
60.01 -1.4987
64.98 -1.7217
70.03 -1.8791
74.97 -1.9657
80.14 -1.9850
84.98 -1.9369
90.03 -1.8185
100.14 -1.3722
100.01 -1.3797

COS IS -0.16853

SIN IS -0.69364

BETA IS 0.00687

100.14 -1.7905
100.01 -1.7895

COS IS -0.16322

SIN IS -0.65550

BETA IS 0.12591

FOR DEGREE OF 2 COEFFICIENTS ARE

0.65178E 01 -0.21553E 00 0.13655E-02

50.03 -0.8473

54.97 -1.2038

60.14 -1.5054

60.01 -1.4987

64.98 -1.7217

70.03 -1.8791

74.97 -1.9657

80.14 -1.9850

84.98 -1.9369

90.03 -1.8185

100.14 -1.3722

100.01 -1.3797

COS IS -0.16853

SIN IS -0.69364

BETA IS 0.00687

FOR DEGREE OF 3 COEFFICIENTS ARE

0.78889E 01 -0.27302E 00 0.21461E-02 -0.34363E-05

50.03 -0.8289

54.97 -1.2049

60.14 -1.5159

60.01 -1.5090

64.98 -1.7330

70.03 -1.8859

74.97 -1.9651

80.14 -1.9764

84.98 -1.9228

90.03 -1.8036

100.14 -1.7809

100.01 -1.3378

COS IS -0.16879

SIN IS -0.69263

BETA IS 0.00736

FOR DEGREE OF 4 COEFFICIENTS ARE

0.13080E 02 -0.57381E 00 0.85424E-02 -0.62585E-04 0.20077E-06

50.03 -0.8257

54.97 -1.2038

100.01 -1.3358
 104.98 -1.2371
 105.98 -1.0010
 109.02 -0.7490
 110.03 -1.1297
 112.02 -0.5890
 114.97 -1.2055
 120.14 -1.0330
 120.01 -0.5638
 124.98 -0.5517
 130.03 -0.5475
 134.97 -0.5694
 140.14 -0.5971
 140.01 -0.5796

COS IS -0.16862

SIN IS -0.69372

BETA IS 0.00951

SECTION--3

X Y
 100.01 -1.3358
 104.98 -1.2371
 105.98 -1.0010
 109.02 -0.7490
 110.03 -1.1297
 112.02 -0.5890
 114.97 -1.2055
 120.14 -1.0330
 120.01 -0.5638
 124.98 -0.5517
 130.03 -0.5475
 134.97 -0.5694
 140.14 -0.5971
 140.01 -0.5796

0.140000E 02	0.166729E 04	0.200835E 06	0.244695E 08	0.301510E 10
-0.116892E 02	0.166729E 04	0.200835E 06	0.244695E 08	0.301510E 10
0.375610E 12	-0.135367E 04	0.200835E 06	0.244695E 08	0.301510E 10
0.375610E 12	0.472867E 14	-0.158507E 06	0.244695E 08	0.301510E 10
0.375610E 12	0.472867E 14	0.601262E 16	-0.187749E 08	0.301510E 10
0.375610E 12	0.472867E 14	0.601262E 16	0.771667E 18	-0.225018E 10

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.28464E 01 0.16890E-01

100.01 -1.1572
 104.98 -1.0733
 105.98 -1.0564
 109.02 -1.0051
 110.03 -0.9880
 112.02 -0.9544
 114.97 -0.9046
 120.14 -0.8172
 120.01 -0.8194
 124.98 -0.7355
 130.03 -0.6502
 134.97 -0.5668
 140.14 -0.4794
 140.01 -0.4816

COS IS 0.12839

SIN IS -0.24947

BETA IS 0.04593

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.10564E 02 0.14565E 00 -0.53097E-03

100.01 -1.3081
 104.98 -1.1252
 105.98 -1.0915
 109.02 -0.9958
 110.03 -0.9661
 112.02 -0.9109
 114.97 -0.8368
 120.14 -0.7291
 120.01 -0.7315
 124.98 -0.6541
 130.03 -0.6023
 134.97 -0.5779
 140.14 -0.5801
 140.01 -0.5797

COS IS 0.12434

SIN IS -0.24450

BETA IS 0.04391

FOR DEGREE OF 3 COEFFICIENTS ARE

SIN IS 0.24947

BETA IS 0.04593

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.10564E 02 0.14565E 00 -0.53097E-03

100.01 -1.3081
104.98 -1.1252
105.98 -1.0915
109.02 -0.9958
110.03 -0.9661
112.02 -0.9109
114.97 -0.8368
120.14 -0.7291
120.01 -0.7315
124.98 -0.6541
130.03 -0.6023
134.97 -0.5779
140.14 -0.5801
140.01 -0.5797

COS IS 0.12434

SIN IS -0.24458

BETA IS 0.04391

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.39924E 01 -0.14355E-01 0.75819E-03 -0.34382E-05

100.01 -1.2840
104.98 -1.1215
105.98 -1.0907
109.02 -1.0012
110.03 -0.9729
112.02 -0.9194
114.97 -0.8461
120.14 -0.7357
120.01 -0.7382
124.98 -0.6557
130.03 -0.5988
134.97 -0.5718
140.14 -0.5768
140.01 -0.5762

COS IS 0.12432

SIN IS -0.24459

BETA IS 0.04833

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.28856E 01 -0.52032E-02 0.50180E-04 0.38284E-05 -0.22013E-07

100.01 -1.2768
104.98 -1.1232
105.98 -1.0907

103.98 -1.0734
 109.02 -1.0055
 110.03 -0.9773
 112.02 -0.9236
 114.97 -0.8487
 120.14 -0.7338
 120.01 -0.7364
 124.98 -0.6492
 130.03 -0.5900
 134.97 -0.5660
 140.14 -0.5831
 140.01 -0.5021

COS IS 0.12385

SIN IS -0.24411

BETA IS 0.05379

SECTION--4

X Y
 140.01 -0.5796
 144.98 -0.5646
 150.03 -0.5444
 154.97 -0.5629
 160.14 -0.5654
 160.01 -0.5568
 164.98 -0.5363
 170.03 -0.5312
 174.97 -0.5278
 180.14 -0.5394
 180.01 -0.5227
 184.98 -0.5301
 190.03 -0.5312
 194.97 -0.5341
 200.14 -0.5738
 200.01 -0.5173
 204.98 -0.5707
 210.03 -0.5545
 214.97 -0.5622
 220.14 -0.5778
 220.01 -0.5343

0.210000E 02	0.382053E 04	0.707601E 06	0.133286E 09	0.255026E 11
-0.115171E 02	0.382053E 04	0.707601E 06	0.133286E 09	0.255026E 11
0.494994E 13	-0.209444E 04	0.707601E 06	0.133286E 09	0.255026E 11
0.494994E 13	0.973240E 15	-0.387896E 06	0.133286E 09	0.255026E 11
0.494994E 13	0.973240E 15	0.193572E 18	-0.730862E 08	0.255026E 11
0.494994E 13	0.973240E 15	0.193572E 18	0.388954E 26	-0.139919E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.56087E 00 0.68452E-04

140.01 -0.5513
 144.98 -0.5510
 150.03 -0.5506
 154.97 -0.5503
 160.14 -0.5499
 160.01 -0.5499
 164.98 -0.5496
 170.03 -0.5492
 174.97 -0.5489
 180.14 -0.5486
 180.01 -0.5486
 184.98 -0.5482
 190.03 -0.5479
 194.97 -0.5475
 200.14 -0.5472
 200.01 -0.5472
 204.98 -0.5469
 210.03 -0.5465
 214.97 -0.5462
 220.14 -0.5458
 220.01 -0.5458

COS IS 0.35259

SIN IS -0.00044

BETA IS 0.00040

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.12688E 01 0.80077E-02 -0.21857E-04

140.01 -0.5761
 144.98 -0.5673
 150.03 -0.5594
 154.97 -0.5528
 160.14 -0.5470
 160.01 -0.5471
 164.98 -0.5426
 170.03 -0.5391
 174.97 -0.5368

174.97 -0.5489
 180.14 -0.5486
 180.01 -0.5486
 184.98 -0.5482
 190.03 -0.5479
 194.97 -0.5475
 200.14 -0.5472
 200.01 -0.5472
 204.98 -0.5469
 210.03 -0.5465
 214.97 -0.5462
 220.14 -0.5458
 220.01 -0.5458

COS IS 0.35259

SIN IS -0.00044

BETA IS 0.00040

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.12688E 01 0.80077E-02 -0.21857E-04

140.01 -0.5761
 144.98 -0.5673
 150.03 -0.5594
 154.97 -0.5528
 160.14 -0.5470
 160.01 -0.5471
 164.98 -0.5426
 170.03 -0.5391
 174.97 -0.5368
 180.14 -0.5356
 180.01 -0.5356
 184.98 -0.5354
 190.03 -0.5364
 194.97 -0.5384
 200.14 -0.5413
 200.01 -0.5415
 204.98 -0.5457
 210.03 -0.5511
 214.97 -0.5574
 220.14 -0.5652
 220.01 -0.5650

COS IS 0.35122

SIN IS -0.00088

BETA IS 0.00026

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.13458E 01 0.93171E-02 -0.29193E-04 0.13547E-07

140.01 -0.5764
 144.98 -0.5673
 150.03 -0.5593
 154.97 -0.5526
 160.14 -0.5468
 160.01 -0.5469
 164.98 -0.5424

170.01 -0.5350
 174.97 -0.5358
 180.14 -0.5356
 180.01 -0.5356
 184.98 -0.5355
 190.03 -0.5365
 194.97 -0.5386
 200.14 -0.5418
 200.01 -0.5417
 204.98 -0.5459
 210.03 -0.5512
 214.97 -0.5574
 220.14 -0.5650
 220.01 -0.5648

COS IS 0.35123

SIN IS -0.00087

BETA IS 0.00027

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.10692E 01 -0.35781E-02 0.13497E-03 -0.79924E-06 0.13970E-08

140.01 -0.5811
 144.98 -0.5693
 150.03 -0.5592
 154.97 -0.5510
 160.14 -0.5444
 160.01 -0.5445
 164.98 -0.5398
 170.03 -0.5366
 174.97 -0.5350
 180.14 -0.5348
 180.01 -0.5348
 184.98 -0.5358
 190.03 -0.5379
 194.97 -0.5409
 200.14 -0.5448
 200.01 -0.5446
 204.98 -0.5488
 210.03 -0.5532
 214.97 -0.5575
 220.14 -0.5616
 220.01 -0.5615

COS IS 0.35132

SIN IS -0.00071

BETA IS 0.00028

SECTION--5

X Y
 220.01 -0.5343
 224.98 -0.5707
 230.03 -0.5639
 234.97 -0.5809
 240.14 -0.6122
 240.01 -0.5467
 244.98 -0.6059
 250.03 -0.5981
 254.97 -0.7184
 250.98 -0.9475
 260.14 -1.3848
 260.01 -1.1545

0.120000E 02 0.291925E 04 0.712305E 06 0.174317E 09 0.427816E 11
 -0.881790E 01 0.291925E 04 0.712305E 06 0.174317E 09 0.427816E 11
 0.105290E 14 -0.217733E 04 0.712305E 06 0.174317E 09 0.427816E 11
 0.105290E 14 0.259830E 16 -0.539224E 06 0.174317E 09 0.427816E 11
 0.105290E 14 0.259830E 16 0.642874E 18 -0.133920E 09 0.427816E 11
 0.105290E 14 0.259830E 16 0.642874E 18 0.159460E 21 -0.333502E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

0.29297E 01 -0.15064E-01

220.01 -0.3844
 224.98 -0.4593
 230.03 -0.5354
 234.97 -0.6098
 240.14 -0.6877
 240.01 -0.6857
 244.98 -0.7606
 250.03 -0.8366
 254.97 -0.9111
 250.98 -0.9715
 260.14 -0.9889
 260.01 -0.9870

COS IS 0.10682

SIN IS 0.20912

244.98 -0.6059
 250.03 -0.5981
 254.97 -0.7184
 258.98 -0.9475
 260.14 -1.3848
 260.01 -1.1545

0.120000E 02	0.291925E 04	0.712305E 06	0.174317E 09	0.427816E 11
-0.881790E 01	0.291925E 04	0.712305E 06	0.174317E 09	0.427816E 11
0.105290E 14	-0.217733E 04	0.712305E 06	0.174317E 09	0.427816E 11
0.105290E 14	0.259830E 16	-0.539224E 06	0.174317E 09	0.427816E 11
0.105290E 14	0.259830E 16	0.642874E 18	-0.133920E 09	0.427816E 11
0.105290E 14	0.259830E 16	0.642874E 18	0.159460E 21	-0.333502E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

0.29297E 01 -0.15064E-01

220.01 -0.3844
 224.98 -0.4593
 230.03 -0.5354
 234.97 -0.6098
 240.14 -0.6877
 240.01 -0.6857
 244.98 -0.7606
 250.03 -0.8366
 254.97 -0.9111
 258.98 -0.9715
 260.14 -0.9889
 260.01 -0.9870

COS IS 0.10682

SIN IS 0.20912

BETA IS 0.03648

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.39123E 02 0.33391E 00 -0.72174E-03

220.01 -0.5955
 224.98 -0.5322
 230.03 -0.5044
 234.97 -0.5128
 240.14 -0.5593
 240.01 -0.5577
 244.98 -0.6379
 250.03 -0.7558
 254.97 -0.9069
 258.98 -1.0554
 260.14 -1.1027
 260.01 -1.0973

COS IS 0.10285

SIN IS 0.19823

BETA IS 0.01914

FOR DEGREE OF 3 COEFFICIENTS ARE

220.01 -0.6382
 224.98 -0.5530
 230.03 -0.5043
 234.97 -0.4958
 240.14 -0.5307
 240.01 -0.5292
 244.98 -0.6060
 250.03 -0.7307
 254.97 -0.9004
 258.98 -1.0744
 260.14 -1.1310
 260.01 -1.1245

COS IS 0.10216

SIN IS 0.19562

BETA IS 0.02013

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.85208E 01 -0.16731E-01 0.33092E-03 0.61200E-06 -0.46778E-08

220.01 -0.6264
 224.98 -0.5503
 230.03 -0.5073
 234.97 -0.5014
 240.14 -0.5363
 240.01 -0.5349
 244.98 -0.6100
 250.03 -0.7321
 254.97 -0.8991
 258.98 -1.0713
 260.14 -1.1275
 260.01 -1.1211

COS IS 0.10232

SIN IS 0.19599

BETA IS 0.02251

SECTION--6

X Y
 260.01 -1.1545
 264.98 -1.5054
 270.03 -1.7206
 274.97 -1.9735
 280.01 -2.0539
 290.03 -1.9826
 294.97 -1.8565
 300.14 -1.6905
 300.01 -1.6266
 304.98 -1.4154
 310.03 -1.0917

0.110000E 02 0.315016E 04 0.905096E 06 0.260886E 09 0.754336E 11
 -0.180712E 02 0.315016E 04 0.905096E 06 0.260886E 09 0.754336E 11
 0.218777E 14 -0.516959E 04 0.905096E 06 0.260886E 09 0.754336E 11
 0.218777E 14 0.636378E 16 -0.140303E 07 0.260886E 09 0.754336E 11
 0.218777E 14 0.636378E 16 0.185636E 19 -0.426629E 09 0.754336E 11
 0.218777E 14 0.636378E 16 0.185636E 19 0.542992E 21 -0.123064E 12

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.21847E 01 0.18920E-02

260.01 -1.6927
 264.98 -1.6833
 270.03 -1.6738
 274.97 -1.6644
 280.01 -1.6549
 290.03 -1.6359
 294.97 -1.6266
 300.14 -1.6168
 300.01 -1.6170
 304.98 -1.6076
 310.03 -1.5981

COS IS -0.17717

SIN IS 0.67265

BETA IS 0.11669

FOR DEGREE OF 2 COEFFICIENTS ARE

0.12129E 03 -0.86767E 00 0.15259E-02

260.01 -1.1581
 264.98 -1.4891
 270.03 -1.7482

0.218777E 14	0.636378E 16	-0.140303E 07	0.260886E 09	0.754334E 11
0.213777E 14	0.636378E 16	0.185636E 19	-0.426629E 09	0.754334E 11
0.218777E 14	0.636378E 16	0.185636E 19	0.542992E 21	-0.123064E 17

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.21847E 01 0.18920E-02

260.01	-1.6927
264.98	-1.6833
270.03	-1.6738
274.97	-1.6644
280.01	-1.6549
290.03	-1.6359
294.97	-1.6266
300.14	-1.6168
300.01	-1.6170
304.98	-1.6076
310.03	-1.5981

COS IS -0.17717

SIN IS 0.67265

BETA IS 0.11669

FOR DEGREE OF 2 COEFFICIENTS ARE

0.12129E 03 -0.86767E 00 0.15259E-02

260.01	-1.1581
264.98	-1.4891
270.03	-1.7482
274.97	-1.9263
280.01	-2.0313
290.03	-2.0099
294.97	-1.8865
300.14	-1.6777
300.01	-1.6839
304.98	-1.4082
310.03	-1.0509

COS IS -0.18811

SIN IS 0.71507

BETA IS 0.00132

FOR DEGREE OF 3 COEFFICIENTS ARE

0.86534E 02 -0.49445E 00 0.19226E-03 0.15855E-05

260.01	-1.1599
264.98	-1.4867
270.03	-1.7453
274.97	-1.9254
280.01	-2.0337
290.03	-2.0178
294.97	-1.8944
300.14	-1.6819
300.01	-1.6883
304.98	-1.4045
310.03	-1.0509

COS IS -0.18827

SIN IS 0.71557

BETA IS 0.00198

FOR DEGREE OF 4 COEFFICIENTS ARE

0.83888E 02 -0.53460E 00 0.81080E-03 -0.80930E-06 0.29233E-08

260.01 -1.1637
264.98 -1.4854
270.03 -1.7414
274.97 -1.9211
280.01 -2.0305
290.03 -2.0189
294.97 -1.8972
300.14 -1.6850
300.01 -1.6914
304.98 -1.4059
310.03 -1.0297

COS IS -0.18833

SIN IS 0.71528

BETA IS 0.00256

SECTION-7

X Y
310.03 -1.0917
314.97 -0.8182
320.14 -0.5099
320.01 -0.4734
324.98 -0.2023
330.03 0.1129
334.97 0.3500
340.14 0.5774
340.01 0.5977
344.98 0.7671
350.03 0.9074
354.97 0.9903
360.14 1.0239

0.130000E 02 0.434540E 04 0.145549E 07 0.488522E 09 0.164303E 12
0.223120E 01 0.434540E 04 0.145549E 07 0.488522E 09 0.164303E 12
0.553721E 14 0.880003E 03 0.145549E 07 0.488522E 09 0.164303E 12
0.553721E 14 0.186986E 17 0.339313E 06 0.488522E 09 0.164303E 12
0.553721E 14 0.186986E 17 0.632692E 19 0.128673E 09 0.164303E 12
0.553721E 14 0.186986E 17 0.632692E 19 0.214499E 22 0.481807E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.14801E 02 0.44792E-01

310.03 -0.9137
314.97 -0.6925
320.14 -0.4609
320.01 -0.4667
324.98 -0.2441
330.03 -0.0179
334.97 0.2034
340.14 0.4349
340.01 0.4291
344.98 0.6517
350.03 0.8780
354.97 1.0992
360.14 1.3308

COS IS 0.10803

SIN IS 0.02639

BETA IS 0.02356

CD = 0.48400

CL = -0.00838

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.57091E 02 0.29709E 00 -0.37791E-03

310.03 -1.0596
314.97 -0.7549
320.14 -0.4556
320.01 -0.4629
324.98 -0.1938
330.03 0.0605
334.97 0.2704
340.14 0.4349

324.98	-0.1441
330.03	-0.0179
334.97	0.2034
340.14	0.4349
340.01	0.4291
344.98	0.6517
350.03	0.8730
354.97	1.0992
360.14	1.3308

COS IS 0.10803

SIN IS 0.02639

BETA IS 0.02356

CD = 0.48400

CL = -0.00838

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.57091E 02 0.29789E 00 -0.37791E-03

310.03	-1.0596
314.97	-0.7549
320.14	-0.4556
320.01	-0.4629
324.98	-0.1938
330.03	0.0605
334.97	0.2906
340.14	0.5117
340.01	0.5064
344.98	0.7003
350.03	0.8783
354.97	1.0338
360.14	1.1767

COS IS 0.11202

SIN IS 0.02433

BETA IS 0.00576

CD = 0.46780

CL = -0.00965

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.57796E 02 0.16100E 00 0.45920E-03 -0.12577E-05

310.03	-1.2211
314.97	-0.8282
320.14	-0.4552
320.01	-0.4640
324.98	-0.1421
330.03	0.1461
334.97	0.3893
340.14	0.6017

340.03 0.7970
 344.97 0.7607
 320.03 0.8045
 354.97 0.9631
 360.14 0.9994

COS IS 0.11672
 SIN IS 0.02226
 BETA IS 0.00319

CD = 0.47242

CL = -0.01388

FOR DEGREE OF 4 COEFFICIENTS ARE

0.22222E 02 -0.24545E 00 0.51577E-04 0.35096E-05 -0.61454E-08

310.03 -1.1055
 314.97 -0.7853
 320.14 -0.4655
 320.01 -0.4733
 324.98 -0.1832
 330.03 0.0901
 334.97 0.3335
 340.14 0.5588
 340.01 0.5535
 344.93 0.7392
 350.03 0.8921
 354.97 1.0032
 360.14 1.0746

COS IS 0.11429
 SIN IS 0.02347
 BETA IS 0.00131

CD = 0.46924

CL = -0.01317

END OF RUN:SEQ 94:5

EXEC = 1.56 SU

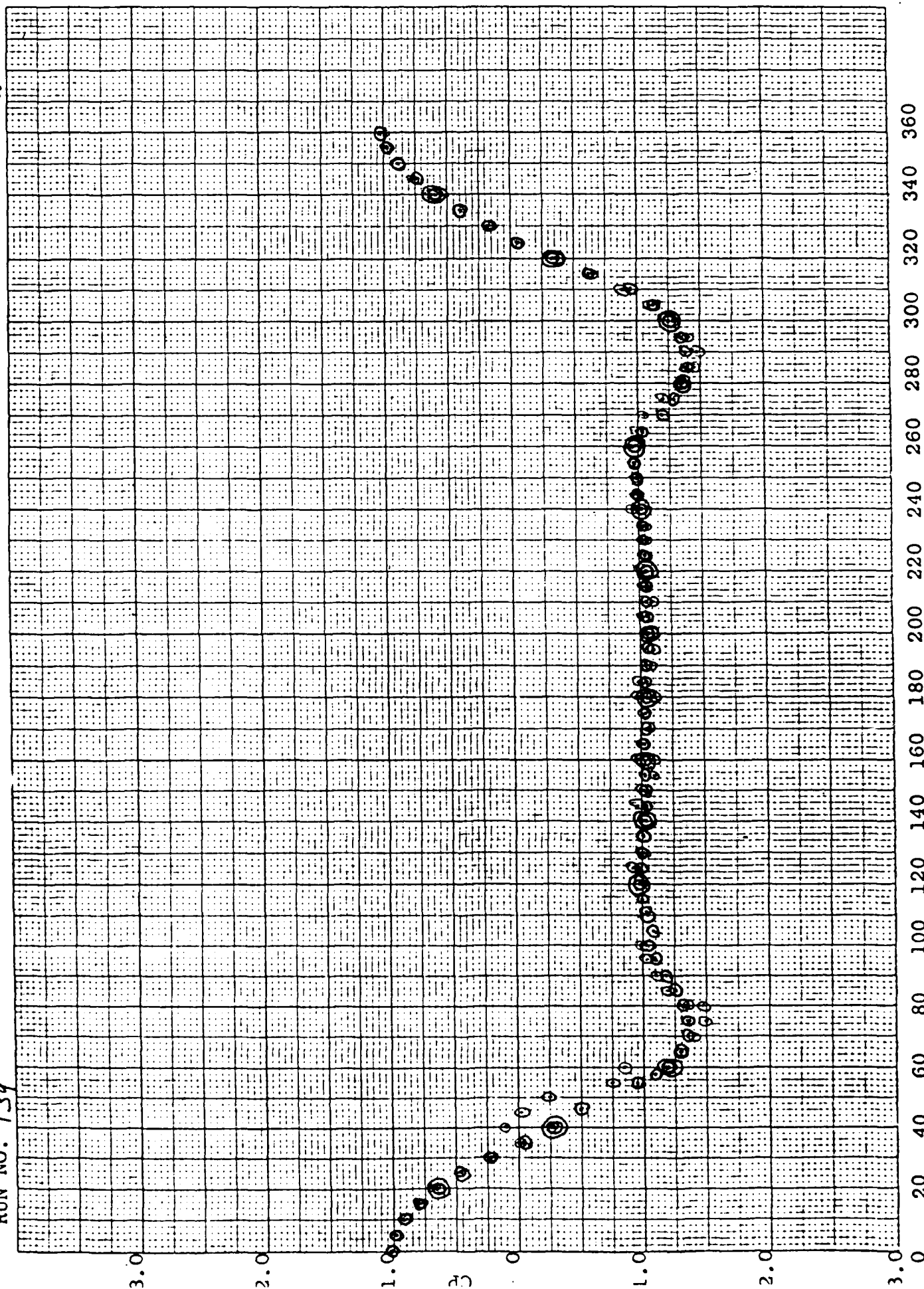
STATEMENTS EXECUTED= 18717

CORE USAGE OBJECT CODE= 14320 BYTES.ARRAY AREA= 3660 BYTES.TOTAL AREA AVAILABLE= 0
 DIAGNOSTICS NUMBER OF ERRORS= 0. NUMBER OF WARNINGS= 0. NUMBER OF EXTENSIONS= 0

END OF JGR MUSJOB CODE=ME01 000 AT 08H57M FRI JUN 14, 1985 EXECUTE TIME 2.8 SERVICE UNIT
 420 CARDS READ 1372 LINES PRINTED 0 CARDS PUNCHED 0 TAPE MOUNTS 0 DISK MOUNTS

INITIALS: *GD*

RUN NO: *139*



114.86 -1.0178
 119.97 -0.9899
 119.98 -0.9899
 124.94 -0.9739
 129.90 -0.9735
 134.86 -0.9937
 139.97 -1.0418
 139.98 -1.0419

COS IS 0.17212

SIN IS -0.30329

BETA IS 0.00149

0
 SECTION--4

X	Y
139.98	-1.0118
144.94	-0.9665
149.90	-1.0216
154.86	-1.1005
159.97	-1.0969
159.98	-0.9980
164.94	-1.0224
169.90	-1.0694
174.86	-1.0319
179.97	-1.1069
179.98	-0.9841
184.94	-0.9947
189.90	-1.0729
194.86	-1.1010
199.97	-1.0656
199.98	-1.0812
204.94	-1.0259
209.90	-1.0971
214.86	-1.0353
219.97	-1.0449
219.98	-1.0223

0.210000E 02	0.381858E 04	0.706883E 06	0.133085E 07	0.254515E 11
-0.219509E 02	0.381858E 04	0.706883E 06	0.133085E 09	0.254515E 11
0.493763E 13	-0.399675E 04	0.706883E 06	0.133085E 09	0.254515E 11
0.493763E 13	0.970354E 15	-0.740670E 06	0.133085E 09	0.254515E 11
0.493763E 13	0.970354E 15	0.192907E 18	-0.139565E 09	0.254515E 11
0.493763E 13	0.970354E 15	0.192907E 18	0.387435E 20	-0.267076E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.96868E 00 -0.42127E-03

139.98	-1.0276
144.94	-1.0297
149.90	-1.0318
154.86	-1.0339
159.97	-1.0361
159.98	-1.0361
164.94	-1.0382

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.48100E 01 0.61052E-01 -0.24345E-03

99.98 -1.1396
104.94 -1.0842
109.90 -1.0408
110.98 -1.0329
114.86 -1.0094
119.97 -0.9895
119.98 -0.9895
124.94 -0.9824
129.90 -0.9873
134.86 -1.0042
139.97 -1.0341
139.98 -1.0342

COS IS 0.17268

SIN IS -0.30366

BETA IS 0.00083

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.38873E 01 0.37557E-01 -0.45455E-04 -0.55213E-06

99.98 -1.1385
104.94 -1.0847
109.90 -1.0417
110.98 -1.0338
114.86 -1.0099
119.97 -0.9892
119.98 -0.9892
124.94 -0.9813
129.90 -0.9859
134.86 -1.0033
139.97 -1.0351
139.98 -1.0352

COS IS 0.17261

SIN IS -0.30362

BETA IS 0.00096

FOR DEGREE OF 4 COEFFICIENTS ARE

0.10297E 01 -0.45220E-01 -0.44527E-04 0.51778E-05 -0.23626E-07

99.98 -1.1226
104.94 -1.0876
109.90 -1.0515
110.98 -1.0438

114.86 -1.0178
119.97 -0.9899
119.98 -0.9899
124.94 -0.9739
129.90 -0.9735
134.86 -0.9937
139.97 -1.0418
139.98 -1.0419

COS IS 0.17212

SIN IS -0.30329

BETA IS 0.00149

SECTION -4

X Y
139.98 -1.0118
144.94 -0.9665
149.90 -1.0216
154.86 -1.1005
159.97 -1.0969
159.98 -0.9980
164.94 -1.0224
169.90 -1.0694

87.90 -1.1848
94.86 -1.1058
99.97 -1.0307
99.98 -1.0306

COS IS -0.13842

SIN IS -0.50141

BETA IS 0.01854

SECTION--3

X Y
99.98 -1.1592
104.94 -1.0613
109.90 -1.0598
110.98 -0.9990
114.86 -1.0266
119.97 -1.0155
119.98 -0.9668
124.94 -0.9470
129.90 -1.0286
134.86 -1.0127
139.97 -1.0396
139.98 -1.0118

0.120000E 02	0.145026E 04	0.177241E 06	0.218985E 08	0.273414E 10
-0.123279E 02	0.145026E 04	0.177241E 06	0.218985E 08	0.273414E 10
0.344798E 12	-0.140600E 04	0.177241E 06	0.218985E 08	0.273414E 10
0.344798E 12	0.438924E 14	-0.181207E 06	0.218985E 08	0.273414E 10
0.344798E 12	0.438924E 14	0.563661E 16	-0.223476E 08	0.273414E 10
0.344798E 12	0.438924E 14	0.563661E 16	0.729726E 18	-0.278617E 10

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.12657E 01 0.19725E-02

99.98 -1.0685
104.94 -1.0587
109.90 -1.0489
110.98 -1.0468
114.86 -1.0391
119.97 -1.0291
119.98 -1.0290
124.94 -1.0193
129.90 -1.0095
134.86 -0.9997
139.97 -0.9896
139.98 -0.9896

COS IS 0.17444

SIN IS -0.30566

BETA IS 0.00236

57.97 -1.0324
 59.98 -1.0985
 64.94 -1.2318
 69.90 -1.3227
 74.86 -1.3714
 79.98 -1.3772
 84.94 -1.3398
 89.90 -1.2601
 94.86 -1.1381
 99.97 -0.9681
 99.98 -0.9677

COS IS -0.13703

SIN IS -0.50633

BETA IS 0.01852

FOR DEGREE OF 3 COEFFICIENTS ARE

0.97064E 01 -0.38862E 00 0.44235E-02 -0.16110E-04

46.02 -0.3797
 54.86 -0.9600
 57.97 -1.0949
 59.98 -1.1652
 64.94 -1.2876
 69.90 -1.3468
 74.86 -1.3545
 79.98 -1.3211
 84.94 -1.2606
 89.90 -1.1845
 94.86 -1.1045
 99.97 -1.0305
 99.98 -1.0304

COS IS -0.13838

SIN IS -0.50137

BETA IS 0.01606

FOR DEGREE OF 4 COEFFICIENTS ARE

0.10569E 02 -0.43729E 00 0.54259E-02 -0.25058E-04 0.29297E-07

46.02 -0.3749
 54.86 -0.9630
 57.97 -1.0979
 59.98 -1.1677
 64.94 -1.2884
 69.90 -1.3457
 74.86 -1.3524
 79.98 -1.3190
 84.94 -1.2595

89.90 -1.1848
 94.86 -1.1058
 99.97 -1.0307
 99.98 -1.0306

COS IS -0.13842

SIN IS -0.50141

BETA IS 0.01854

0
 SECTION--3

X Y
 99.98 -1.1592
 104.94 -1.0613
 109.90 -1.0598
 110.98 -0.9990
 114.86 -1.0265
 117.97 -1.0155
 119.98 -0.9668
 124.94 -0.9470
 129.90 -1.0286
 134.86 -1.0127
 139.97 -1.0396
 139.98 -1.0118

BETA IS 0.00025

SECTION--2

X	Y
46.02	-0.4990
54.86	-0.7520
57.97	-0.9835
59.98	-1.2173
64.94	-1.3158
69.90	-1.4323
74.86	-1.5115
79.98	-1.3517
84.94	-1.1756
89.90	-1.0910
94.86	-1.0404
99.97	-0.9913
99.98	-1.1592

0.130000E 02	0.978159E 03	0.774748E 05	0.641118E 07	0.549904E 09
-0.145206E 02	0.978159E 03	0.774748E 05	0.641118E 07	0.549904E 09
0.485312E 11	-0.111270E 04	0.774748E 05	0.641118E 07	0.549904E 09
0.485312E 11	0.437974E 13	-0.888241E 05	0.641118E 07	0.549904E 09
0.485312E 11	0.437974E 13	0.402184E 15	-0.735235E 07	0.549904E 09
0.485312E 11	0.437974E 13	0.402184E 15	0.374366E 17	-0.627822E 09

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.72622E 00 -0.51931E-02

46.02	-0.9652
54.86	-1.0111
57.97	-1.0273
59.98	-1.0377
64.94	-1.0635
69.90	-1.0892
74.86	-1.1150
79.98	-1.1416
84.94	-1.1673
89.90	-1.1931
94.86	-1.2188
99.97	-1.2454
99.98	-1.2454

COS IS -0.13696

SIN IS -0.48246

BETA IS 0.07416

FOR DEGREE OF 2 COEFFICIENTS ARE

0.38639E 01 -0.13433E 00 0.86021E-03

46.02	-0.4961
54.86	-0.9165

19.98	0.6285
24.94	0.4565
29.90	0.2579
34.86	0.0325
39.97	-0.2276
46.02	-0.5722

COS IS 0.17254

SIN IS 0.02664

BETA IS 0.00221

FOR DEGREE OF 3 COEFFICIENTS ARE

0.10004E 01 0.75146E-02 -0.15730E-02 0.15039E-04

-0.02	1.0003
4.94	1.0010
9.90	0.9352
14.86	0.8141
19.97	0.6429
19.98	0.6426
24.94	0.4427
29.90	0.2208
34.86	-0.0121
39.97	-0.2520
46.02	-0.5195

COS IS 0.17242

SIN IS 0.02532

BETA IS 0.00067

FOR DEGREE OF 4 COEFFICIENTS ARE

0.10203E 01 -0.79133E-02 0.75507E-04 -0.41836E-04 0.61521E-06

-0.02	1.0204
4.94	0.9783
9.90	0.9146
14.86	0.8121
19.97	0.6570
19.98	0.6566
24.94	0.4589
29.90	0.2245
34.86	-0.0276
39.97	-0.2767
46.02	-0.5021

COS IS 0.17053

SIN IS 0.02458

BETA IS 0.00025

SECTION--2

X	Y
46.02	-0.4990
54.86	-0.7520
57.97	-0.9835
59.98	-1.2173
64.94	-1.3158
69.90	-1.4323
74.86	-1.5115
77.98	-1.3517
84.94	-1.1756
89.90	-1.0710
94.86	-1.0404
99.97	-0.9913
99.98	-1.1592

0.10000E 02	0.978159E 03	0.774748E 05	0.641118E 07	0.549904E 09
-0.145206E 02	0.770159E 03	0.774748E 05	0.641118E 07	0.549904E 09
0.485312E 11	-0.511270E 04	0.774748E 05	0.641118E 07	0.549904E 09
0.435712E 11	0.437974E 13	-0.808241E 05	0.641118E 07	0.549904E 09
0.485312E 11	0.437974E 13	0.402134E 15	-0.735235E 07	0.549904E 09
0.485312E 11	0.437974E 13	0.402134E 15	0.574366E 17	0.549904E 09

FOR DEGREE OF 1 COEFFICIENTS ARE

RUN: SEQ
139:5

SECTION--1

X	Y
-0.02	1.0166
4.94	0.9856
9.90	0.9199
14.86	0.7998
19.97	0.6315
19.98	0.6738
24.94	0.4736
29.90	0.2241
34.86	-0.0245
39.97	-0.2854
46.02	-0.4990

0.110000E 02	0.245320E 03	0.758791E 04	0.266238E 06	0.100778E 08
0.491599E 01	0.245320E 03	0.758791E 04	0.266238E 06	0.100778E 08
0.400637E 09	0.352008E 02	0.758791E 04	0.266238E 06	0.100778E 08
0.400637E 09	0.164652E 11	-0.235955E 03	0.266238E 06	0.100778E 08
0.400637E 09	0.164652E 11	0.692760E 12	-0.405198E 05	0.100778E 08
0.400637E 09	0.164652E 11	0.692760E 12	0.296543E 14	-0.238418E 07

FOR DEGREE OF 1 COEFFICIENTS ARE

0.12311E 01 -0.35163E-01

-0.02	1.2318
4.94	1.0574
9.90	0.8830
14.86	0.7086
19.97	0.5289
19.98	0.5286
24.94	0.3541
29.90	0.1797
34.86	0.0053
39.97	-0.1744
46.02	-0.3871

COS IS 0.16855

SIN IS 0.02508

BETA IS 0.01497

FOR DEGREE OF 2 COEFFICIENTS ARE

0.10508E 01 -0.10293E-01 -0.54267E-03

-0.02	1.0510
4.94	0.9867
9.90	0.8957
14.86	0.7780
19.97	0.6288

```

303      XF1=XL/57.3
304      ELSE
305      XF1=XF/57.3
306      ENDIF
C
307      T1=C1(1)*(-COS(XF1))
308      TB1=SIN(XF1)-(XF1*COS(XF1))
309      T2=T1+(C1(2)*TB1)
310      IF(J.EQ.2)THEN
311      TT5=0.5*T2
312      ELSE
313      TB2=(2.*XF1)*SIN(XF1)
314      TB3=TB2+((2.-(XF1**2))*COS(XF1))
315      T3=T2+(C1(3)*TB3)
316      ENDIF
317      IF(J.EQ.3)THEN
318      TT5=0.5*T3
319      ENDIF
320      IF((J.NE.2).AND.(J.NE.3))THEN
321      TB4=((3.*(XF1**2))-6.)*SIN(XF1)
322      TB5=TB4+((6.*XF1)-(XF1**3))*COS(XF1)
323      T4=T3+(C1(4)*TB5)
324      ENDIF
325      IF(J.EQ.4)THEN
326      TT5=0.5*T4
327      ENDIF
328      IF(J.EQ.5)THEN
329      T5=((4.*(XF1**3))-(24.*XF1))*SIN(XF1)
330      T6=((XF1**4)-(12.*(XF1**2))+24.)*COS(XF1)
331      T7=(T5-T6)*C1(5)
332      T8=T4+T7
333      TT5=0.5*T8
334      ENDIF
335      IF(I.EQ.1)THEN
336      SUM2=TT5
337      ENDIF
338      IF(I.EQ.2)THEN
339      SUM1=TT5
340      ENDIF
341      10 CONTINUE
C
342      ALPHA=SUM2-SUM1
343      PRINT ' '
344      PRINT 66,ALPHA
345      66 FORMAT(9X,' SIN IS '.F10.5)
346      IF(J.EQ.2)THEN
347      CL3=CL3+ALPHA
348      ENDIF
349      IF(J.EQ.3)THEN
350      CL2=CL2+ALPHA
351      ENDIF
352      IF(J.EQ.4)THEN
353      CL=CL+ALPHA
354      ENDIF
355      IF(J.EQ.5)THEN
356      CL1=CL1+ALPHA
357      ENDIF
358      RETURN
359      END

```

RUN:SEQ
139:5

SECTION--1

X	Y
-0.02	1.0166
4.94	0.9856
9.90	0.9199
14.86	0.7998
19.97	0.6315
19.98	0.6738
24.94	0.4736
29.90	0.2241
34.86	-0.0245
39.97	-0.2854
46.02	-0.4990

0.110000E 02	0.245320E 03	0.758791E 04	0.266238E 06	0.100778E 08
0.191594E 01	0.245320E 03	0.758791E 04	0.266238E 06	0.100778E 08
0.400637E 09	0.352000E 02	0.758791E 04	0.266238E 06	0.100778E 08
0.400637E 09	0.164652E 11	-0.235955E 03	0.266238E 06	0.100778E 08
0.400637E 09	0.164652E 11	0.692760E 12	-0.405190E 05	0.100778E 08
0.400637E 09	0.164652E 11	0.692760E 12	0.296543E 14	-0.238418E 07

FOR DEGREE OF 1 COEFFICIENTS ARE

```

247         TB2=(2.*XF1)*COS(XF1)
248         TB3=TB2+(((XF1**2)-2.)*SIN(XF1))
249         T3=T2+(C1(3)*TB3)
250     ENDIF
251     IF(J.EQ.3)THEN
252         TT5=0.5*T3
253     ENDIF
254     IF((J.NE.2).AND.(J.NE.3))THEN
255         TB4=((3.*(XF1**2))-6.)*COS(XF1)
256         TB5=TB4+(((XF1**3)-(6.*XF1))*SIN(XF1))
257         T4=T3+(C1(4)*TB5)
258     ENDIF
259     IF(J.EQ.4)THEN
260         TT5=0.5*T4
261     ENDIF
262     IF(J.EQ.5)THEN
263         T5=((XF1**4)-(12.*(XF1**2))+24.)*SIN(XF1)
264         T6=((4.*(XF1**3))-(24.*XF1))*COS(XF1)
265         T7=((T5+T6)*C1(5))
266         T8=T4+T7
267         TT5=0.5*T8
268     ENDIF
269     IF(I.EQ.1)THEN
270         SUM2=TT5
271     ENDIF
272     IF(I.EQ.2)THEN
273         SUM1=TT5
274     ENDIF
275 10 CONTINUE
C
276     ALPHA=SUM2-SUM1
277     PRINT ' '
278     PRINT 66,ALPHA
279 66 FORMAT(9X,' COS IS '.F10,5)
280     IF(J.EQ.2)THEN
281         CE3=CE3+ALPHA
282     ENDIF
283     IF(J.EQ.3)THEN
284         CE2=CE2+ALPHA
285     ENDIF
286     IF(J.EQ.4)THEN
287         CE=CE+ALPHA
288     ENDIF
289     IF(J.EQ.5)THEN
290         CE1=CE1+ALPHA
291     ENDIF
292     RETURN
293     END
294     SUBROUTINE SINTEG(XF,XL,J,B1,CL,CL1,CL2,CL3)
295     REAL C1(100),B1(100)
C
296     C1(1)=B1(1)
297     DO 5 K=2,J
298         C1(K)=B1(K)*(57.3**((K-1)))
299 5 CONTINUE
C
300     ALPHA=0.0
301     DO 10 I=1,2
302     IF(I.EQ.1)THEN

```

```

197         ELSE
198         A(I,J)=(A(I,J)-SUM)/A(I,I)
199         ENDIF
200     ENDIF
201     30 CONTINUE
202     RETURN
203 C
100 FORMAT(' REDUCTION NOT COMPLETED BECAUSE SMALL VALUE',
1      ' FOUND FOR DIVISION IN ROW ',I3)
204     END
205 C
SUBROUTINE SOLNQ(A,B,N,NDIM)
206     REAL A(NDIM,NDIM),B(NDIM),SUM
207     INTEGER N,I,IM1,K,J,NMJP1,NMJP2
208 C
209     B(1)=B(1)/A(1,1)
210     DO 20 I=2,N
211         IM1=I-1
212         SUM=0.0
213         DO 10 K=1,IM1
214             SUM=SUM+A(I,K)*B(K)
215         10 CONTINUE
216         B(I)=(B(I)-SUM)/A(I,I)
217     20 CONTINUE
218 C
219     DO 40 J=2,N
220         NMJP2=N-J+2
221         NMJP1=N-J+1
222         SUM=0.0
223         DO 30 K=NMJP2,N
224             SUM=SUM+A(NMJP1,K)*B(K)
225         30 CONTINUE
226         B(NMJP1)=B(NMJP1)-SUM
227     40 CONTINUE
228     RETURN
229     END
SUBROUTINE CINTG(XF,XL,J,B1,CE,CE1,CE2,CE3)
230     REAL C1(100),B1(100)
231 C
232     C1(1)=B1(1)
233     DO 5 K=2,J
234         C1(K)=B1(K)*(57.3**(K-1))
235     5 CONTINUE
236 C
237     ALPHA=0.0
238     DO 10 I=1,2
239         IF(I.EQ.1) THEN
240             XF1=XL/57.3
241         ELSE
242             XF1=XF/57.3
243         ENDIF
244 C
245         T1=C1(1)*SIN(XF1)
246         TB1=COS(XF1)+(XF1*SIN(XF1))
247         T2=T1+(C1(2)*TB1)
248         IF(J.EQ.2) THEN
249             TT5=0.5*T2
250         ELSE
251             TB2=(2.*XF1)*COS(XF1)
252             TB3=TB2+(((XF1**2)-2.)*SIN(XF1))
253             T3=T2+(C1(3)*TB3)
254             ENDIF
255             IF(J.EQ.3) THEN
256                 TT5=0.5*T3
257             ENDIF
258             IF((J.NE.2).AND.(J.NE.3)) THEN
259                 TB4=((3.*(XF1**2))-6.)*COS(XF1)
260                 TB5=TB4+(((XF1**3)-(6.*XF1))*SIN(XF1))
261                 T4=T3+(C1(4)*TB5)
262             ENDIF
263             IF(J.EQ.4) THEN
264                 TT5=0.5*T4
265             ENDIF
266             IF(J.EQ.5) THEN
267                 T5=((XF1**4)-(12.*(XF1**2))+(24.*XF1)*SIN(XF1))
268                 T6=((4.*(XF1**3))-(24.*XF1)*COS(XF1))
269                 T7=((T5+16)*C1(5))
270                 TB=T4+T7
271                 TT5=0.5*TB
272             ENDIF
273             IF(I.EQ.1) THEN
274                 SUM2=TT5
275             ENDIF
276             IF(I.EQ.2) THEN
277                 SUM1=TT5
278             ENDIF

```

```

150      IF((KK.EQ.7).AND.(I.EQ.5))THEN
151      PRINT 301,CE1,CL1
152      ENDIF
153      95 CONTINUE
      C
      C
154      999 CONTINUE
      C
155      200 FORMAT(///' DEGREE OF POLYNOMIAL CANNOT EXCEED N - 1. '//
      |          ' REQUESTED MAXIMUM DEGREE TOO LARGE - '
      |          ' REDUCED TO 'I3)
156      201 FORMAT(5(3X,E13.6))
157      202 FORMAT(// ' FOR DEGREE OF 'I2.' COEFFICIENTS ARE'//
      |          ' '5X.6(2X,E12.5))
158      203 FORMAT(9X.' BETA IS 'F10.5//)
159      PRINT 299,ISEQ
160      299 FORMAT(////////.35X.'END OF RUN-SEQ '5A1////)
161      STOP
      C
162      REMOTE BLOCK COEF
163      DO 66 L=1,I
164      N1=I-L+1
165      CP(N1)=C(L)
166      66 CONTINUE
      C
      C
167      DO 55 K=1,N
168      FV=CP(1)
169      DO 49 J=2,I
170      49 FV=(FV*X(K))+CP(J)
171      PRINT 1,X(K),FV
172      55 CONTINUE
173      END BLOCK
174      END
      C
175      SUBROUTINE LUDCMQ(A,N,NDIM)
176      REAL A(NDIM,NDIM),SUM
177      INTEGER N,I,J,JM1,IM1,K
      C
178      DO 30 I=1,N
179      DO 30 J=2,N
180      SUM=0.0
181      IF(J.LE.I)THEN
182      JM1=J-1
183      DO 10 K=1,JM1
184      SUM=SUM+A(I,K)*A(K,J)
185      10 CONTINUE
186      A(I,J)=A(I,J)-SUM
187      ELSE
188      IM1=I-1
189      IF(IM1.NE.0)THEN
190      DO 20 K=1,IM1
191      SUM=SUM+A(I,K)*A(K,J)
192      20 CONTINUE
193      ENDIF
      C
194      25 IF(ABS(A(I,I)).LT. 1.0E-10)THEN
195      PRINT 100,I
196      RETURN

```

```

98      DO 50 I=2,MFP1
99      A(MFP1,I)=0.0
100     DO 40 J=1,N
101     A(MFP1,I)=A(MFP1,I)+XN(J)
102     XN(J)=XN(J)*X(J)
103     40 CONTINUE
104     50 CONTINUE
C
105     DO 70 J=2,MFP1
106     DO 60 I=1,MF
107     A(I,J)=A(I+1,J-1)
108     60 CONTINUE
109     70 CONTINUE
C
110     PRINT ' '
111     PRINT 201, ((A(I,J),J=1,MFP2),I=1,MFP1)
C
112     CALL LUDCMQ(A,MFP1,10)
C
113     MSP1=MS+1
114     DO 95 I=MSP1,MFP1
115     DO 90 J=1,I
116     C(J)=A(J,MFP2)
117     90 CONTINUE
118     CALL SOLNQ(A,C,I,10)
119     IM1=I-1
C
120     PRINT 202,IM1,(C(J),J=1,I)
121     PRINT ' '
122     EXECUTE COEF
C
123     DO 300 K=1,I
124     300 B1(K)=C(K)
125     CALL CINTG(XF,XL,I,B1,CE,CE1,CE2,CE3)
126     CALL SINTG(XF,XL,I,B1,CL,CL1,CL2,CL3)
C
127     PRINT ' '
128     BETA=0.0
129     DO 94 IPT =1,N
130     SUM=0.0
131     DO 93 ICOEF=2,I
132     JCOEF=I-ICOEF+2
133     SUM=(SUM+C(JCOEF))*X(IPT)
134     93 CONTINUE
135     SUM=SUM+C(1)
136     BETA=BETA+(Y(IPT)-SUM)**2
137     94 CONTINUE
138     BETA=BETA/(N-1)
139     PRINT 203,BETA
140     IF((KK.EQ.7).AND.(I.EQ.2))THEN
141     PRINT 301,CE3,CL3
142     ENDIF
143     IF((KK.EQ.7).AND.(I.EQ.3))THEN
144     PRINT 301,CE2,CL2
145     ENDIF
146     IF((KK.EQ.7).AND.(I.EQ.4))THEN
147     PRINT 301,CE,CL
148     301 FORMAT(//45X,' CD ='F10.5//.45X,' CL ='F10.5)
149     ENDIF

150     IF((KK.EQ.7).AND.(I.EQ.5))THEN
151     PRINT 301,CE1,CL1
152     ENDIF
153     95 CONTINUE
C
154     999 CONTINUE
C
155     200 FORMAT(// ' DEGREE OF POLYNOMIAL NOT EXCEED N - 1. ' /
156     ' REQUESTED MAXIMUM DEGREE TOO LARGE - ' /
157     ' REDUCED TO ',I3)
158     201 FORMAT(5(3X,E13.6))
159     202 FORMAT(// ' FOR DEGREE OF ',I2,' COEFFICIENTS ARE'//
160     ' ',5X,6(2X,E12.5))
161     203 FORMAT(9X,' BETA IS 'F10.5//)
162     PRINT 299,ISEQ
163     299 FORMAT(////////.35X,'END OF RUN SEQ ',5A1////)
164     STOP
C
165     REMOTE BLOCK COFF
166     DO 66 L=1,I
167     N1=I-L+1
168     CP(N1)=C(L)
169     66 CONTINUE
C
170     DO 55 K=1,N

```

```

50 C PRINT , ' X      Y'
51 IF (KK.EQ.1) THEN
52 DO 3 I=1,N
53 3 READ , K1,Y(I),K2,X(I)
54 TEMP1=X(N)
55 TEMP2=Y(N)
56 ENDIF
57 IF (KK.NE.1) THEN
58 X(1)=TEMP1
59 Y(1)=TEMP2
60 DO 4 I=2,N
61 4 READ ,K1,Y(I),K2,X(I)
62 TEMP1=X(N)
63 TEMP2=Y(N)
64 ENDIF
65 C PRINT 1,(X(I),Y(I),I=1,N)
66 1 FORMAT(2X,F6.2,2X,F8.4)
67 C IF (KK.EQ.1) THEN
68 XF=0.0
69 XL=X(N)
70 ELSE
71 XF=X(1)
72 XL=X(N)
73 ENDIF
74 C IF (KK.EQ.7) THEN
75 XF=X(1)
76 XL=360.
77 ELSE
78 XL=X(N)
79 ENDIF
80 C C C
81 C READ , MS,MF
82 C IF (MF.GT.(N-1)) THEN
83 MF=N-1
84 PRINT 200,MF
85 200 ENDIF
86 5 MFP1=MF+1
87 MFP2=MF+2
88 C DO 10 I=1,N
89 XN(I)=1.0
90 10 CONTINUE
91 C DO 30 I=1,MFP1
92 A(I,1)=0.0
93 A(I,MFP2)=0.0
94 DO 20 J=1,N
95 A(I,1)=A(I,1)+XN(J)
96 A(I,MFP2)=A(I,MFP2)+Y(J)*XN(J)
97 XN(J)=XN(J)*X(J)
98 20 CONTINUE
99 30 CONTINUE

```

```

1      DIMENSION ISEQ(5)
2      REAL X(100),Y(100),C(100),B1(100),A(10,11),XN(100),SUM,BETA
3      REAL CP(100),FV
4      INTEGER N,MS,MF,MFP1,MFP2,I,J,IM1,IPT,ICOE,JCOEF
5      CHARACTER*5 ISEQ
6      DATA MS/1/,MF/4/
7
8      C
9      C
10     C
11     PRINT , 'RUN:SEQ'
12     READ 11,ISEQ
13     FORMAT(5A1)
14     PRINT 11,ISEQ
15     PRINT , '-----'
16
17     C
18     CE=0.0
19     CL=0.0
20     CE1=0.0
21     CL1=0.0
22     CE2=0.0
23     CL2=0.0
24     CE3=0.0
25     CL3=0.0
26     DO 999 KK=1,7
27     PRINT 33
28     33 FORMAT('0')
29     IF(KK.EQ.1)THEN
30         PRINT , 'SECTION--1'
31         N=11
32     ENDIF
33
34     C
35     IF(KK.EQ.2)THEN
36         PRINT , 'SECTION--2'
37         N=13
38     ENDIF
39
40     C
41     IF(KK.EQ.3)THEN
42         PRINT , 'SECTION--3'
43         N=12
44     ENDIF
45
46     C
47     IF(KK.EQ.4)THEN
48         PRINT , 'SECTION--4'
49         N=21
50     ENDIF
51
52     C
53     IF(KK.EQ.5)THEN
54         PRINT , 'SECTION--5'
55         N=11
56     ENDIF
57
58     C
59     IF(KK.EQ.6)THEN
60         PRINT , 'SECTION--6'
61         N=13
62     ENDIF
63
64     C
65     IF(KK.EQ.7)THEN
66         PRINT , 'SECTION--7'
67         N=13
68     ENDIF
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174.86	-1.0423
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179.98	-1.0445
184.94	-1.0466
189.90	-1.0487
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COS IS 0.67135

SIN IS 0.00222

BETA IS 0.00180

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.26577E 00 -0.83080E-02 0.21722E-04

139.98	-1.0031
144.94	-1.0136
149.90	-1.0230
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159.98	-1.0389
164.94	-1.0451
169.90	-1.0503
174.86	-1.0543
179.97	-1.0574
179.98	-1.0574
184.94	-1.0593
189.90	-1.0601
194.86	-1.0599
199.97	-1.0585
199.98	-1.0585
204.94	-1.0561
209.90	-1.0526
214.86	-1.0480
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COS IS 0.67270

SIN IS 0.00263

BETA IS 0.00174

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.45509E 00 -0.50696E-02 0.34717E-05 0.33893E-07

139.98	-1.0037
144.94	-1.0137
149.90	-1.0229
154.86	-1.0310
159.97	-1.0385
159.98	-1.0385
164.94	-1.0447
169.90	-1.0500
174.86	-1.0542
179.97	-1.0575
179.98	-1.0575
184.94	-1.0595
189.90	-1.0605
194.86	-1.0604
199.97	-1.0590
199.98	-1.0590
204.94	-1.0565
209.90	-1.0528
214.86	-1.0479
219.97	-1.0415
219.98	-1.0415

COS IS 0.67273

SIN IS 0.00267

-0.45509E 00 -0.50696E-02 0.34717E-05 0.33893E-07

139.98 -1.0037
144.94 -1.0137
149.90 -1.0229
154.86 -1.0310
159.97 -1.0385
159.98 -1.0385
164.94 -1.0447
169.90 -1.0500
174.86 -1.0542
179.97 -1.0575
179.98 -1.0575
184.94 -1.0595
189.90 -1.0605
194.86 -1.0604
199.97 -1.0590
199.98 -1.0590
204.94 -1.0565
209.90 -1.0528
214.86 -1.0479
219.97 -1.0415
219.98 -1.0415

COS IS 0.67273

SIN IS 0.00267

BETA IS 0.00184

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.56109E 00 -0.45290E-02 0.14482E-04 -0.63854E-07 0.21166E-09

139.98 -1.0052
144.94 -1.0143
149.90 -1.0228
154.86 -1.0306
159.97 -1.0378
159.98 -1.0378
164.94 -1.0440
169.90 -1.0493
174.86 -1.0537
179.97 -1.0573
179.98 -1.0573
184.94 -1.0596
189.90 -1.0609
194.86 -1.0610
199.97 -1.0598
199.98 -1.0598
204.94 -1.0573
209.90 -1.0533
214.86 -1.0479
219.97 -1.0407
219.98 -1.0406

COS IS 0.67275

SIN IS 0.00271

BETA IS 0.00196

SECTION--5

X	Y
219.98	-1.0223
224.94	-1.0467
229.90	-1.0451
234.86	-1.0526
239.97	-1.0380
239.98	-0.9529
244.94	-0.9740
249.90	-0.9793
254.86	-0.9628
259.97	-0.9828
259.98	-0.9598

0.110000E 02	0.265928E 04	0.644751E 06	0.156769E 09	0.382251E 11
-0.110163E 02	0.265928E 04	0.644751E 06	0.156769E 09	0.382251E 11
0.934615E 13	-0.265928E 04	0.644751E 06	0.156769E 09	0.382251E 11
0.934615E 13	0.229132E 16	-0.643806E 06	0.156769E 09	0.382251E 11
0.934615E 13	0.229132E 16	0.563217E 18	-0.156312E 09	0.382251E 11
0.934615E 13	0.229132E 16	0.563217E 18	0.138795E 21	-0.380593E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.15121E 01 0.21120E-02

219.98	-1.0475
224.94	-1.0370
229.90	-1.0265
234.86	-1.0160
239.97	-1.0052
239.98	-1.0052
244.94	-0.9947
249.90	-0.9843
254.86	-0.9738
259.97	-0.9630
259.98	-0.9630

COS IS 0.17355

SIN IS 0.29676

BETA IS 0.00080

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.10929E 01 -0.13742E-02 0.72278E-05

219.98	-1.0454
224.94	-1.0363
229.90	-1.0268

234.86	-1.0170
239.97	-1.0065
239.98	-1.0064
244.94	-0.9959
249.90	-0.9849
254.86	-0.9737
259.97	-0.9617
259.98	-0.9617

COS IS 0.17359

SIN IS 0.29685

BETA IS 0.00090

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.90292E 00 -0.42227E-02 0.21037E-04 -0.21807E-07

219.98	-1.0459
224.94	-1.0365
229.90	-1.0260
234.86	-1.0168
239.97	-1.0061
239.98	-1.0061

234.86 -1.0170
 239.97 -1.0065
 239.98 -1.0064
 244.94 -0.9959
 249.90 -0.9849
 254.86 -0.9737
 259.97 -0.9617
 259.98 -0.9617

COS IS 0.17359

SIN IS 0.29685

BETA IS 0.00090

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.90292E 00 -0.42227E-02 0.21037E-04 -0.21807E-07

219.98 -1.0459
 224.94 -1.0365
 229.90 -1.0268
 234.86 -1.0168
 239.97 -1.0061
 239.98 -1.0061
 244.94 -0.9955
 249.90 -0.9847
 254.86 -0.9737
 259.97 -0.9621
 259.98 -0.9620

COS IS 0.17358

SIN IS 0.29683

BETA IS 0.00103

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.37306E 01 0.16109E-01 0.58441E-04 -0.57191E-06 0.10245E-08

219.98 -1.0480
 224.94 -1.0365
 229.90 -1.0258
 234.86 -1.0157
 239.97 -1.0055
 239.98 -1.0055
 244.94 -0.9956
 249.90 -0.9853
 254.86 -0.9744
 259.97 -0.9621
 259.98 -0.9621

COS IS 0.17356

SIN IS 0.29681

BETA IS 0.00123

SECTION--6

X	Y
259.98	-0.9598
264.94	-0.9955
269.90	-1.0633
274.86	-1.1925
279.97	-1.3674
279.98	-1.3655
284.94	-1.4562
289.90	-1.4585
294.86	-1.3758
299.97	-1.2466
299.98	-1.2761
304.94	-1.1038
309.90	-0.8904

0.130000E 02	0.371412E 04.	0.106412E 07	0.305726E 09	0.880768E 11
-0.157514E 02	0.371412E 04	0.106412E 07	0.305726E 09	0.880768E 11
0.254423E 14	-0.450586E 04	0.106412E 07	0.305726E 09	0.880768E 11
0.254423E 14	0.736872E 16	-0.129210E 07	0.305726E 09	0.880768E 11
0.254423E 14	0.736872E 16	0.213964E 19	-0.371411E 09	0.880768E 11
0.254423E 14	0.736872E 16	0.213964E 19	0.622833E 21	-0.107014E 12

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.67006E 00 -0.18956E-02

259.98	-1.1629
264.94	-1.1723
269.90	-1.1817
274.86	-1.1911
279.97	-1.2000
279.98	-1.2008
284.94	-1.2102
289.90	-1.2196
294.86	-1.2290
299.97	-1.2387
299.98	-1.2387
304.94	-1.2481
309.90	-1.2575

COS IS -0.13431

SIN IS 0.49268

BETA IS 0.03978

FOR DEGREE OF 2 COEFFICIENTS ARE

0.19369E 03 -0.13685E 01 0.23956E-02

259.98	-0.1860
264.94	-0.7367
269.90	-1.1696
274.86	-1.4845
279.97	-1.6058
279.98	-1.6860
284.94	-1.7615
289.90	-1.7190
294.86	-1.5587
299.97	-1.2703
299.98	-1.2696
304.94	-0.8697
309.90	-0.3520

COS IS -0.14368

SIN IS 0.51930

BETA IS 0.15062

FOR DEGREE OF 3 COEFFICIENTS ARE

0.23550E 02 -0.41987E-01 -0.61700E-03 0.14047E 05

259.98 -0.8706

259.98 -0.1860
 264.94 -0.7367
 269.90 -1.1696
 274.86 -1.4845
 279.97 -1.6058
 279.98 -1.6860
 284.94 -1.7615
 289.90 -1.7190
 294.86 -1.5587
 299.97 -1.2703
 299.98 -1.2696
 304.94 -0.8697
 309.90 -0.3520

COS IS -0.14368

SIN IS 0.51930

BETA IS 0.15062

FOR DEGREE OF 3 COEFFICIENTS ARE

0.23550E 02 -0.41987E-01 -0.61700E-03 0.16047E-05

259.98 -0.8706
 264.94 -1.0404
 269.90 -1.1777
 274.86 -1.2815
 279.97 -1.3521
 279.98 -1.3522
 284.94 -1.3841
 289.90 -1.3789
 294.86 -1.3354
 299.97 -1.2492
 299.98 -1.2490
 304.94 -1.1240
 309.90 -0.9572

COS IS -0.13696

SIN IS 0.50121

BETA IS 0.00557

FOR DEGREE OF 4 COEFFICIENTS ARE

0.23210E 02 -0.40151E-01 -0.61160E-03 0.15580E-05 0.69849E-10

259.98 -0.8710
 264.94 -1.0405
 269.90 -1.1776
 274.86 -1.2813
 279.97 -1.3519
 279.98 -1.3520
 284.94 -1.3840

289.90 -1.3789
 294.86 -1.3354
 299.97 -1.2494
 299.98 -1.2491
 304.94 -1.1242
 309.90 -0.9572

COS IS -0.13697

SIN IS 0.50120

BETA IS 0.00626

SECTION-7

X	Y
309.90	-0.8904
314.86	-0.6486
319.97	-0.3612
319.98	-0.3306
324.94	-0.0695
329.90	0.1687
334.86	0.3996
339.97	0.6171
339.98	0.6010
344.94	0.7677
349.90	0.8886
354.86	0.9720
359.97	1.0098

0.130000E 02	0.434403E 04	0.145458E 07	0.488059E 09	0.164096E 12
0.312420E 01	0.434403E 04	0.145458E 07	0.488059E 09	0.164096E 12
0.552844E 14	0.116365E 04	0.145458E 07	0.488059E 09	0.164096E 12
0.552844E 14	0.186630E 17	0.429363E 06	0.488059E 09	0.164096E 12
0.552844E 14	0.186630E 17	0.631283E 19	0.157243E 09	0.164096E 12
0.552844E 14	0.186630E 17	0.631283E 19	0.213952E 22	0.572382E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.13117E 02 0.39972E-01

309.90	-0.7292
314.86	-0.5310
319.97	-0.3267
319.98	-0.3263
324.94	-0.1281
329.90	0.0702
334.86	0.2685
339.97	0.4727
339.98	0.4731
344.94	0.6714
349.90	0.8696
354.86	1.0679
359.97	1.2722

COS IS 0.13085

SIN IS 0.00786

BETA IS 0.01784

CD = 1.04747

CL = 0.03648

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.31079E 03 0.18219E 01 -0.26612E-02

309.90	-1.7642
314.86	-0.9741
319.97	-0.2974
319.98	-0.2961
324.94	0.2275
329.90	0.6206
334.86	0.8823
339.97	1.0154
339.98	1.0154
344.94	1.0112
349.90	0.8762
354.86	0.6101
359.97	0.1992

COS IS 0.13556
SIN IS 0.00529
BETA IS 0.00149

CD = 1.05157
CL = 0.02633

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.25801E 02 0.20266E-01 0.29248E-03 0.13964E-06 -0.14814E-08

309.90 -0.9385
314.86 -0.6248
319.97 -0.3251
319.98 -0.3246
324.94 -0.0579
329.90 0.1837
334.86 0.3988
339.97 0.5915
339.98 0.5918
344.94 0.7492
349.90 0.8760
354.86 0.9709
359.97 1.0337

COS IS 0.13663
SIN IS 0.00491
BETA IS 0.00080

CD = 1.05021
CL = 0.02551

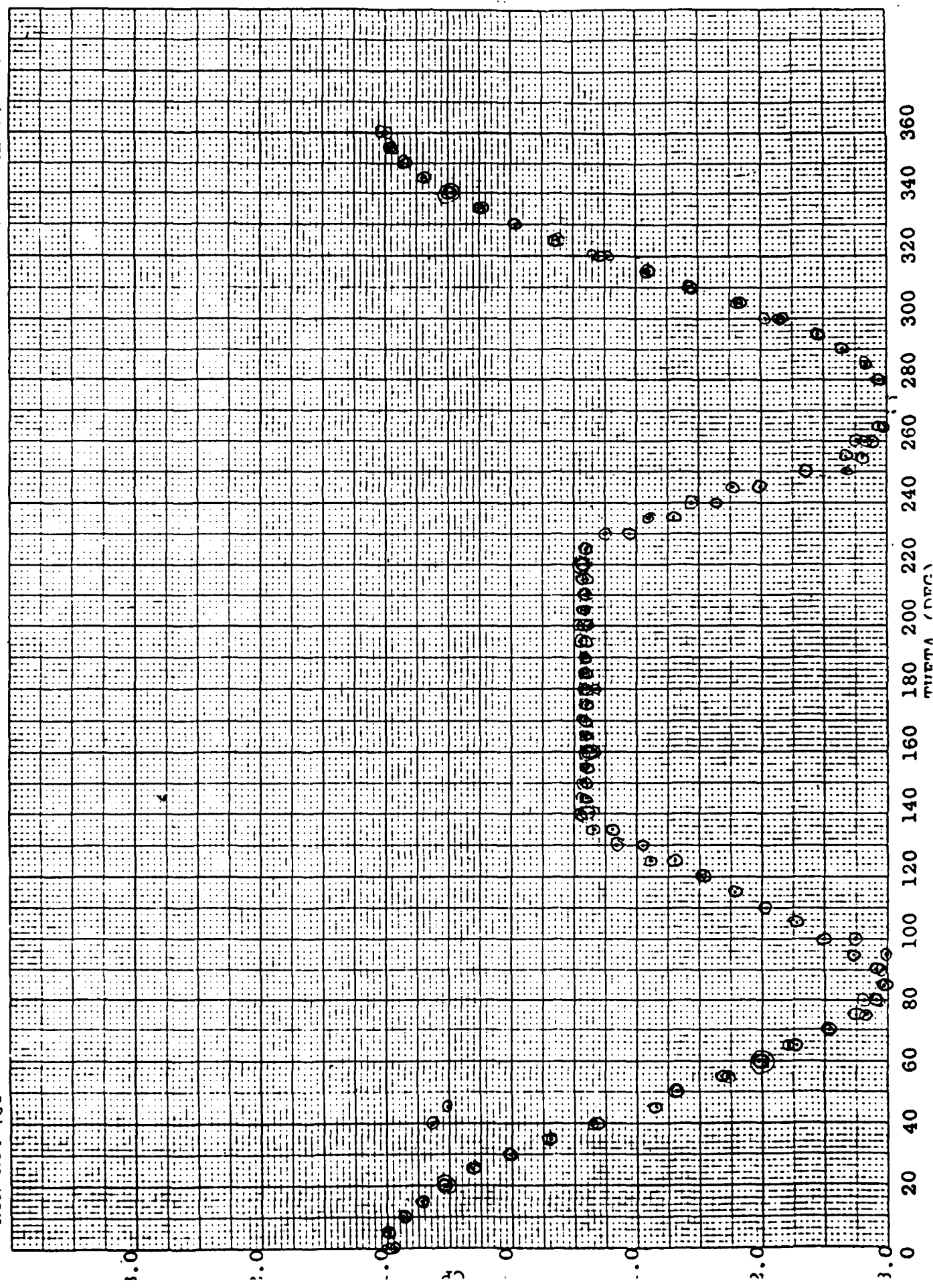
END OF RUN:SEQ 139:5

30 X 40 PER INCH

MADE IN U.S.A.

RUN NO: 188

INITIALS: M.M.



```

1      DIMENSION ISEQ(5)
2      REAL X(100),Y(100),C(100),B1(100),A(10,11),XN(100),SUM,BETA
3      REAL CP(100),FV
4      INTEGER N,MS,MF,MFP1,MFP2,I,J,IM1,IPT,ICDEF,JCOEF
5      CHARACTER*5 ISEQ
6      DATA MS/1/,MF/4/
7
8      C
9      C
10     C
11     PRINT 'RUN:SEQ'
12     READ 11,ISEQ
13     FORMAT(5A1)
14     PRINT 11,ISEQ
15     PRINT '-----'
16
17     C
18     CE=0.0
19     CL=0.0
20     CE1=0.0
21     CL1=0.0
22     CE2=0.0
23     CL2=0.0
24     CE3=0.0
25     CL3=0.0
26     DO 999 KK=1,7
27     PRINT 33
28     33 FORMAT('0')
29     IF(KK.EQ.1)THEN
30         PRINT 'SECTION--1'
31         N=12
32     ENDIF
33
34     C
35     IF(KK.EQ.2)THEN
36         PRINT 'SECTION--2'
37         N=13
38     ENDIF
39
40     C
41     IF(KK.EQ.3)THEN
42         PRINT 'SECTION--3'
43         N=15
44     ENDIF
45
46     C
47     IF(KK.EQ.4)THEN
48         PRINT 'SECTION--4'
49         N=21
50     ENDIF
51
52     C
53     IF(KK.EQ.5)THEN
54         PRINT 'SECTION--5'
55         N=13
56     ENDIF
57
58     C
59     IF(KK.EQ.6)THEN
60         PRINT 'SECTION--6'
61         N=12
62     ENDIF
63
64     C
65     IF(KK.EQ.7)THEN
66         PRINT 'SECTION--7'
67         N=13
68     ENDIF
69

```

```

50 C PRINT , ' X Y'
51 IF(KK.EQ.1)THEN
52 DO 3 I=1,N
53 3 READ , K1,Y(I),K2,X(I)
54 TEMP1=X(N)
55 TEMP2=Y(N)
56 ENDF
57 IF(KK.NE.1)THEN
58 X(1)=TEMP1
59 Y(1)=TEMP2
60 DO 4 I=2,N
61 4 READ ,K1,Y(I),K2,X(I)
62 TEMP1=X(N)
63 TEMP2=Y(N)
64 ENDF
65 C PRINT 1,(X(I),Y(I),I=1,N)
66 1 FORMAT(2X,F6.2,2X,F8.4)
67 C IF(KK.EQ.1)THEN
68 XF=0.0
69 XL=X(N)
70 ELSE
71 XF=X(1)
72 XL=X(N)
73 ENDF
74 C IF(KK.EQ.7)THEN
75 XF=X(1)
76 XL=360.
77 ELSE
78 XL=X(N)
79 ENDF
80 C C
81 C READ , MS,MF
82 C IF(MF.GT.(N-1))THEN
83 MF=N-1
84 PRINT 200,MF
85 ENDF
86 5 MFP1=MF+1
87 MFP2=MF+2
88 C DO 10 I=1,N
89 XN(I)=1.0
90 10 CONTINUE
91 C DO 30 I=1,MFP1
92 A(I,1)=0.0
93 A(I,MFP2)=0.0
94 DO 20 J=1,N
95 A(I,1)=A(I,1)+XN(J)
96 A(I,MFP2)=A(I,MFP2)+Y(J)*XN(J)
97 XN(J)=XN(J)*X(J)
98 20 CONTINUE
99 30 CONTINUE
100 C DO 50 I=2,MFP1
101 A(MFP1,I)=0.0
102 DO 40 J=1,N
103 A(MFP1,I)=A(MFP1,I)+XN(J)
104 XN(J)=XN(J)*X(J)
105 40 CONTINUE
106 50 CONTINUE
107 C DO 70 J=2,MFP1
108 DO 60 I=1,MF
109 A(I,J)=A(I+1,J-1)
110 60 CONTINUE
111 70 CONTINUE
112 C PRINT , ' '
113 PRINT 201, ((A(I,J),J=1,MFP2),I=1,MFP1)
114 C CALL LUDCHQ(A,MFP1,10)
115 C MSP1=MS+1
116 DO 90 I=MFP1,MFP1
117 DO 90 J=1,I
118 C(J)=A(J,MFP2)
119 90 CONTINUE
120 CALL SOLNQ(A,C,I,10)
121 IM1=I-1
122 C PRINT 202, ((C(I),I=1,IM1),I=1,IM1)

```

```

98      DO 50 I=2,MFP1
99      A(MFP1,I)=0.0
100     DO 40 J=1,N
101     A(MFP1,I)=A(MFP1,I)+XN(J)
102     XN(J)=XN(J)*X(J)
103     40 CONTINUE
104     50 CONTINUE
      C
105     DO 70 J=2,MFP1
106     DO 60 I=1,MF
107     A(I,J)=A(I+1,J-1)
108     60 CONTINUE
109     70 CONTINUE
      C
110     PRINT ' '
111     PRINT 201, ((A(I,J),J=1,MFP2),I=1,MFP1)
      C
112     CALL LUDCHQ(A,MFP1,10)
      C
113     MSP1=MS+1
114     DO 95 I=MSP1,MFP1
115     DO 90 J=1,I
116     C(J)=A(J,MFP2)
117     90 CONTINUE
118     CALL SOLND(A,C,I,10)
119     IM1=I-1
      C
120     PRINT 202,IM1,(C(J),J=1,I)
121     PRINT ' '
122     EXECUTE COEF
      C
123     DO 300 K=1,I
124     B1(K)=C(K)
125     CALL CINTG(XF,XL,I,B1,CE,CE1,CE2,CE3)
126     CALL SINTG(XF,XL,I,B1,CL,CL1,CL2,CL3)
      C
127     PRINT ' '
128     BETA=0.0
129     DO 94 IPT =1,N
130     SUM=0.0
131     DO 93 ICDEF=2,I
132     JCOEF=I-ICDEF+2
133     SUM=(SUM+C(JCOEF))*X(IPT)
134     93 CONTINUE
135     SUM=SUM+C(1)
136     BETA=BETA+(Y(IPT)-SUM)**2
137     94 CONTINUE
138     BETA=BETA/(N-I)
139     PRINT 203,BETA
140     IF((KK.EQ.7).AND.(I.EQ.2))THEN
141     PRINT 301,CE3,CL3
142     ENDIF
143     IF((KK.EQ.7).AND.(I.EQ.3))THEN
144     PRINT 301,CE2,CL2
145     ENDIF
146     IF((KK.EQ.7).AND.(I.EQ.4))THEN
147     PRINT 301,CE,CL
148     301 FORMAT(///45X,' CD =',F10.5//.45X,' CL =',F10.5)
149     ENDIF

```

```

150      IF((KK.EQ.7).AND.(I.EQ.5))THEN
151      PRINT 301,CE1,CL1
152      ENDIF
153      95 CONTINUE
      C
      C
154      999 CONTINUE
      C
155      200 FORMAT(/// 'DEGREE OF POLYNOMIAL CANNOT EXCEED N - 1.' /
      | 'REQUESTED MAXIMUM DEGREE TOO LARGE - ' /
      | 'REDUCED TO ',I3)
156      201 FORMAT(5(3X,E13.6))
157      202 FORMAT(// 'FOR DEGREE OF ',I2,' COEFFICIENTS ARE'//
      | ' ',5X,6(2X,E12.5))
158      203 FORMAT(9X,' BETA IS ',F10.5//)
159      PRINT 299,ISEQ
160      299 FORMAT(////////.35X,'END OF RUN:SEQ ',5A1////)
161      STOP
      C
162      REMOTE BLOCK COEF
163      DO 66 L=1,I
164      N1=I-L+1
165      CP(N1)=C(L)
166      66 CONTINUE
      C
      C
167      DO 55 K=1,N
168      FV=CP(1)
169      DO 49 J=2,I
170      49 FV=(FV*X(K))+CP(J)
171      PRINT 1,X(K),FV
172      55 CONTINUE
173      END BLOCK
174      END
      C
175      SUBROUTINE LUDCHO(A,N,NDIM)
176      REAL A(NDIM,NDIM),SUM
177      INTEGER N,I,J,JM1,IM1,K
      C
178      DO 30 I=1,N
179      DO 30 J=2,N
180      SUM=0.0
181      IF(J.LE.I)THEN
182      JM1=J-1
183      DO 10 K=1,JM1
184      SUM=SUM+A(I,K)*A(K,J)
185      10 CONTINUE
186      A(I,J)=A(I,J)-SUM
187      ELSE
188      IM1=I-1
189      IF(IM1.NE.0)THEN
190      DO 20 K=1,IM1
191      SUM=SUM+A(I,K)*A(K,J)
192      20 CONTINUE
193      ENDIF
      C
194      25 IF(ABS(A(I,I)).LT. 1.0E-10)THEN
195      PRINT 100,I
196      RETURN
      C
197      ELSE
198      A(I,J)=(A(I,J)-SUM)/A(I,I)
199      ENDIF
200      ENDIF
201      30 CONTINUE
202      RETURN
      C
203      100 FORMAT(' REDUCTION NOT COMPLETED BECAUSE SMALL VALUE',
      | ' FOUND FOR DIVISION IN ROW ',I3)
204      END
      C
205      SUBROUTINE SOLNO(A,B,N,NDIM)
206      REAL A(NDIM,NDIM),B(NDIM),SUM
207      INTEGER N,I,IM1,K,J,NM1,JF1,NMJP2
      C
      C
208      B(1)=B(1)/A(1,1)
209      DO 20 I=2,N
210      IM1=I-1
211      SUM=0.0
212      DO 10 K=1,IM1
213      SUM=SUM+A(I,K)*B(K)
214      10 CONTINUE
215      B(I)=(B(I)-SUM)/A(I,I)
216      20 CONTINUE
      C
217      DO 40 J=2,N

```

```

197         ELSE
198         A(I,J)=(A(I,J)-SUM)/A(I,I)
199         ENDIF
200     ENDIF
201     30 CONTINUE
202     RETURN
203 C
100 FORMAT(' REDUCTION NOT COMPLETED BECAUSE SMALL VALUE',
1      ' FOUND FOR DIVISION IN ROW ',I3)
204     END
205 C
SUBROUTINE SOLNQ(A,B,N,NDIM)
206     REAL A(NDIM,NDIM),B(NDIM),SUM
207     INTEGER N,I,IM1,K,J,NMJP1,NMJP2
208 C
209     B(1)=B(1)/A(1,1)
210     DO 20 I=2,N
211         IM1=I-1
212         SUM=0.0
213         DO 10 K=1,IM1
214             SUM=SUM+A(I,K)*B(K)
215         10 CONTINUE
216         B(I)=(B(I)-SUM)/A(I,I)
217     20 CONTINUE
218 C
219     DO 40 J=2,N
220         NMJP2=N-J+2
221         NMJP1=N-J+1
222         SUM=0.0
223         DO 30 K=NMJP2,N
224             SUM=SUM+A(NMJP1,K)*B(K)
225         30 CONTINUE
226         B(NMJP1)=B(NMJP1)-SUM
227     40 CONTINUE
228     RETURN
229     END
SUBROUTINE CINTEG(XF,XL,J,B1,CE,CE1,CE2,CE3)
230     REAL C1(100),B1(100)
231 C
232     C1(1)=B1(1)
233     DO 5 K=2,J
234         C1(K)=B1(K)*(57.3**(K-1))
235     5 CONTINUE
236 C
237     ALPHA=0.0
238     DO 10 I=1,2
239         IF(I.EQ.1)THEN
240             XF1=XL/57.3
241             ELSE
242             XF1=XF/57.3
243         ENDIF
244 C
245     T1=C1(1)*SIN(XF1)
246     TB1=COS(XF1)+(XF1*SIN(XF1))
247     T2=T1+(C1(2)*TB1)
248     IF(J.EQ.2)THEN
249         TT5=0.5*T2
250     ELSE

```

-0.10961E 02 0.29356E-01

260.00 -3.3282
264.93 -3.1835
269.95 -3.0361
274.90 -2.8908
279.98 -2.7417
280.00 -2.7411
284.93 -2.5964
289.95 -2.4490
294.90 -2.3037
300.00 -2.1540
304.93 -2.0093
309.95 -1.8619

COS IS -0.23871

SIN IS 1.07027

BETA IS 0.08446

FOR DEGREE OF 2 COEFFICIENTS ARE

0.74893E 02 -0.57455E 00 0.10590E-02

260.00 -2.9038
264.93 -2.9958
269.95 -3.0367
274.90 -3.0246
279.98 -2.9584
280.00 -2.9580
284.93 -2.8412
289.95 -2.6694
294.90 -2.4477
300.00 -2.1651
304.93 -1.8395
309.95 -1.4550

COS IS -0.24258

SIN IS 1.08253

BETA IS 0.00384

FOR DEGREE OF 3 COEFFICIENTS ARE

0.50174E 02 -0.23041E 00 -0.44174E-03 0.20936E-05

260.00 -2.7956
264.93 -2.9415
269.95 -3.0291
274.90 -3.0536
279.98 -3.0132
280.00 -3.0129

284.93 -2.9085
289.95 -2.7348
294.90 -2.4955
300.00 -2.1767
304.93 -1.7971
309.95 -1.3371

COS IS -0.24399

SIN IS 1.08591

BETA IS 0.00529

FOR DEGREE OF 4 COEFFICIENTS ARE

0.16267E 01 0.75734E-01 -0.27532E-03 -0.19674E-05 0.63405E-08

260.00 -2.8976
264.93 -2.9796
269.95 -3.0215
274.90 -3.0181
279.98 -2.9646
280.00 -2.9643
284.93 -2.8602
289.95 -2.6974

260.00 -3.1632
 COS IS 0.23453
 SIN IS 0.51767
 BETA IS 0.06150

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.53957E 01 0.14171E 00 -0.89978E-03 0.24201E-05 -0.35701E-03

220.00 -0.3633
 224.93 -0.6420
 229.95 -0.9433
 234.90 -1.2584
 239.98 -1.6009
 240.00 -1.6023
 244.93 -1.9541
 245.02 -1.9607
 246.02 -2.0345
 248.02 -2.1846
 249.95 -2.3326
 254.90 -2.7267
 260.00 -3.1554

COS IS 0.23453
 SIN IS 0.51766
 BETA IS 0.06976

SECTION--6

X Y
 260.00 -2.8434
 264.93 -2.9391
 269.95 -3.0253
 274.90 -3.1613
 279.98 -2.9364
 280.00 -3.0340
 284.93 -2.8386
 289.95 -2.6459
 294.90 -2.4598
 300.00 -2.1777
 304.93 -1.8085
 309.95 -1.4258

0.120000E 02 0.341442E 04 0.974293E 06 0.278800E 09 0.800056E 11
 -0.312957E 02 0.341442E 04 0.974293E 06 0.278800E 09 0.800056E 11
 0.230228E 14 -0.882338E 04 0.974293E 06 0.278800E 09 0.800056E 11
 0.230228E 14 0.664337E 16 -0.249385E 07 0.278800E 09 0.800056E 11
 0.230228E 14 0.664337E 16 0.192218E 19 -0.706637E 09 0.800056E 11
 0.230228E 14 0.664337E 16 0.192218E 19 0.557638E 21 -0.200732E 12

FOR DEGREE OF 1 COEFFICIENTS ARE

240.00 -1.6516
 244.93 -1.9930
 245.02 -1.9992
 246.02 -2.0684
 248.02 -2.2069
 249.95 -2.3405
 254.90 -2.6832
 260.00 -3.0363

COS IS 0.23447

SIN IS 0.51687

BETA IS 0.05459

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.77540E 01 0.12095E 00 -0.39714E-03

220.00 -0.3667
 224.93 -0.6415
 229.95 -0.9412
 234.90 -1.2563
 239.98 -1.5999
 240.00 -1.6013
 244.93 -1.9545
 245.02 -1.9611
 246.02 -2.0352
 248.02 -2.1857
 249.95 -2.3339
 254.90 -2.7277
 260.00 -3.1537

COS IS 0.23446

SIN IS 0.51759

BETA IS 0.05515

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.38061E 01 0.64440E-01 -0.13207E-03 -0.40872E-06

220.00 -0.3735
 224.93 -0.6447
 229.95 -0.9412
 234.90 -1.2540
 239.98 -1.5964
 240.00 -1.5978
 244.93 -1.9512
 245.02 -1.9579
 246.02 -2.0322
 248.02 -2.1835
 249.95 -2.3327
 254.90 -2.7305

260.00 -3.1632

COS IS 0.23453

SIN IS 0.51767

BETA IS 0.06150

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.53957E 01 0.14171E 00 -0.89978E-03 0.24201E-05 -0.35701E-08

220.00 -0.3633
 224.93 -0.6420
 229.95 -0.9433
 234.90 -1.2584
 239.98 -1.6009
 240.00 -1.6023
 244.93 -1.9541
 245.02 -1.9607
 246.02 -2.0345
 248.02 -2.1846
 249.95 -2.3326
 254.90 -2.7267
 260.00 -3.1554

154.90 -0.6029
 159.98 -0.6024
 160.00 -0.6024
 164.93 -0.6013
 169.95 -0.5999
 174.90 -0.5982
 179.98 -0.5962
 180.00 -0.5962
 184.93 -0.5942
 189.95 -0.5922
 194.90 -0.5902
 199.98 -0.5882
 200.00 -0.5882
 204.93 -0.5864
 209.95 -0.5846
 214.90 -0.5831
 219.98 -0.5816
 220.00 -0.5816

COS IS 0.38233

SIN IS -0.00194

BETA IS 0.00146

SECTION--5

X Y
 220.00 -0.5991
 224.93 -0.6040
 229.95 -0.7473
 234.90 -1.1111
 239.98 -1.4437
 240.00 -1.4393
 244.93 -1.7648
 245.02 -1.9890
 246.02 -2.2410
 248.02 -2.4910
 249.95 -2.6648
 254.90 -2.8203
 260.00 -2.8434

0.130000E 02	0.313860E 04	0.759353E 06	0.184097E 09	0.447222E 11
-0.227588E 02	0.313860E 04	0.759353E 06	0.184097E 09	0.447222E 11
0.108856E 14	-0.560537E 04	0.759353E 06	0.184097E 09	0.447222E 11
0.108856E 14	0.265466E 16	-0.138252E 07	0.184097E 09	0.447222E 11
0.108856E 14	0.265466E 16	0.648597E 18	-0.341450E 09	0.447222E 11
0.108856E 14	0.265466E 16	0.648597E 18	0.158754E 21	-0.844416E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

0.14965E 02 -0.69235E-01

220.00 -0.2669
 224.93 -0.6083
 229.95 -0.9558
 234.90 -1.2985
 239.98 -1.6502

189.95 -0.5934
 174.90 -0.5916
 199.98 -0.5895
 200.00 -0.5895
 204.93 -0.5874
 209.95 -0.5851
 214.90 -0.5826
 219.98 -0.5799
 220.00 -0.5799

COS IS 0.38237

SIN IS -0.00185

BETA IS 0.00130

FOR DEGREE OF 3 COEFFICIENTS ARE

0.38463E 00 -0.16621E-01 0.91262E-04 -0.16226E-06

140.00 -0.5989
 144.93 -0.6013
 149.95 -0.6028
 154.90 -0.6033
 159.98 -0.6031
 160.00 -0.6031
 164.93 -0.6022
 169.95 -0.6007
 174.90 -0.5988
 179.98 -0.5966
 180.00 -0.5966
 184.93 -0.5943
 189.95 -0.5918
 194.90 -0.5894
 199.98 -0.5872
 200.00 -0.5872
 204.93 -0.5853
 209.95 -0.5839
 214.90 -0.5829
 219.98 -0.5827
 220.00 -0.5827

COS IS 0.38230

SIN IS -0.00199

BETA IS 0.00137

FOR DEGREE OF 4 COEFFICIENTS ARE

0.79855E 00 -0.28190E-01 0.20703E-03 -0.65896E-06 0.77610E-09

140.00 -0.6003
 144.93 -0.6020
 149.95 -0.6029

154.90 -0.6029
 159.98 -0.6024
 160.00 -0.6024
 164.93 -0.6013
 169.95 -0.5999
 174.90 -0.5982
 179.98 -0.5962
 180.00 -0.5962
 184.93 -0.5942
 189.95 -0.5922
 194.90 -0.5902
 199.98 -0.5882
 200.00 -0.5882
 204.93 -0.5864
 209.95 -0.5846
 214.90 -0.5831
 219.98 -0.5816
 220.00 -0.5816

COS IS 0.38233

SIN IS -0.00194

BETA IS 0.00146

220.00 -0.5991

0.210000E 02	0.381904E 04	0.707051E 06	0.133132E 09	0.254634E 11
-0.124747E 02	0.381904E 04	0.707051E 06	0.133132E 09	0.254634E 11
0.494047E 13	-0.226494E 04	0.707051E 06	0.133132E 09	0.254634E 11
0.494047E 13	0.971017E 15	-0.418649E 06	0.133132E 09	0.254634E 11
0.494047E 13	0.971017E 15	0.193059E 18	-0.787047E 08	0.254634E 11
0.494047E 13	0.971017E 15	0.193059E 18	0.387782E 20	-0.150312E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.64772E 00 0.29520E-03

140.00	-0.6064
144.93	-0.6049
149.95	-0.6035
154.90	-0.6020
159.98	-0.6005
160.00	-0.6005
164.93	-0.5990
169.95	-0.5975
174.90	-0.5961
179.98	-0.5946
180.00	-0.5946
184.93	-0.5931
189.95	-0.5916
194.90	-0.5902
199.98	-0.5887
200.00	-0.5887
204.93	-0.5872
209.95	-0.5857
214.90	-0.5843
219.98	-0.5828
220.00	-0.5828

COS IS 0.38217

SIN IS -0.00191

BETA IS 0.00124

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.54153E 00 -0.89604E-03 0.32806E-05

140.00	-0.6027
144.93	-0.6025
149.95	-0.6021
154.90	-0.6016
159.98	-0.6009
160.00	-0.6009
164.93	-0.6001
169.95	-0.5991
174.90	-0.5979
179.98	-0.5965
180.00	-0.5965
184.93	-0.5950

COS IS 0.22883
 SIN IS -0.47532
 BETA IS 0.06018

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.10469E 03 0.13548E 01 0.85128E-02 -0.18612E-03 0.67304E-06

100.00 -2.8969
 104.93 -2.2372
 106.02 -2.1305
 109.95 -1.8447
 110.50 -1.8156
 114.02 -1.6801
 114.90 -1.6577
 118.02 -1.6038
 119.98 -1.5827
 120.00 -1.5826
 124.93 -1.5272
 129.95 -1.3801
 134.90 -1.0303
 139.98 -0.3289
 140.00 -0.3253

COS IS 0.24490
 SIN IS -0.49268
 BETA IS 0.20830

SECTION--4

X Y
 140.00 -0.6346
 144.93 -0.5621
 149.95 -0.5590
 154.90 -0.6074
 159.98 -0.6115
 160.00 -0.6551
 164.93 -0.5929
 169.95 -0.5801
 174.90 -0.6181
 179.98 -0.5785
 180.00 -0.6663
 184.93 -0.5706
 189.95 -0.5689
 194.90 -0.5524
 199.98 -0.5362
 200.00 -0.6327
 204.93 -0.5929
 209.95 -0.6024
 214.90 -0.6071
 219.98 -0.5468

220.00 -0.5991

0.210000E 02 0.381904E 04 0.707051E 06 0.133132E 09 0.254634E 11
 -0.124747E 02 0.381904E 04 0.707051E 06 0.133132E 09 0.254634E 11
 0.494047E 13 -0.226494E 04 0.707051E 06 0.133132E 09 0.254634E 11
 0.494047E 13 0.971017E 15 -0.418649E 06 0.133132E 09 0.254634E 11
 0.494047E 13 0.971017E 15 0.193059E 18 -0.787047E 08 0.254634E 11
 0.494047E 13 0.971017E 15 0.193059E 18 0.387792E 20 -0.150312E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.64772E 00 0.29520E-03

140.00 -0.6064
 144.93 -0.6049
 149.95 -0.6035
 154.90 -0.6020
 159.98 -0.6005
 160.00 -0.6005
 164.93 -0.5990
 169.95 -0.5975
 174.90 -0.5961
 179.98 -0.5946
 180.00 -0.5946
 184.93 -0.5931
 189.95 -0.5916
 194.90 -0.5902
 199.98 -0.5887

134.90 -0.7969
137.98 -0.5452
140.00 -0.5442

COS IS 0.22802

SIN IS -0.47461

BETA IS 0.05512

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.29429E 01 -0.26062E-01 0.31168E-03

100.00 -2.4322
104.93 -2.2458
106.02 -2.2026
109.95 -2.0405
110.50 -2.0170
114.02 -1.8624
114.90 -1.8226
118.02 -1.6774
119.98 -1.5831
120.00 -1.5821
124.93 -1.3342
129.95 -1.0663
134.90 -0.7866
139.98 -0.4838
140.00 -0.4826

COS IS 0.22960

SIN IS -0.47606

BETA IS 0.05723

FOR DEGREE OF 3 COEFFICIENTS ARE

0.41541E 01 -0.21062E 00 0.18986E-02 -0.45106E-05

100.00 -2.4321
104.93 -2.2528
106.02 -2.2099
109.95 -2.0463
110.50 -2.0224
114.02 -1.8636
114.90 -1.8225
118.02 -1.6725
119.98 -1.5753
120.00 -1.5743
124.93 -1.3207
129.95 -1.0521
134.90 -0.7804
139.98 -0.4978
140.00 -0.4967

64.93 -2.2829
69.95 -2.5507
74.90 -2.7661
79.98 -2.9179
84.93 -2.9814
89.95 -2.9433
96.25 -2.7240
99.98 -2.4918
100.00 -2.4903

COS IS -0.23097

SIN IS -1.03075

BETA IS 0.02739

SECTION--3

X Y
400.00 -2.1593
104.93 -1.9954
106.02 -2.7490
109.95 -1.8983
110.50 -2.2450
114.02 -1.9790
114.90 -1.8296
118.02 -1.7410
119.98 -1.6687
120.00 -1.5089
124.93 -1.1188
129.95 -0.8382
134.90 -0.6624
139.98 -0.5910
140.00 -0.6346

0.150000E 02	0.178808E 04	0.215363E 06	0.262097E 08	0.322273E 10
-0.236191E 02	0.178808E 04	0.215363E 06	0.262097E 08	0.322273E 10
0.400289E 12	-0.270579E 04	0.215363E 06	0.262097E 08	0.322273E 10
0.400289E 12	0.502083E 14	-0.312393E 06	0.262097E 08	0.322273E 10
0.400289E 12	0.502083E 14	0.635705E 16	-0.363624E 08	0.322273E 10
0.400289E 12	0.502083E 14	0.635705E 16	0.812088E 18	-0.426871E 10

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.74811E 01 0.49549E-01

100.00 -2.5262
104.93 -2.2819
106.02 -2.2279
109.95 -2.0332
110.50 -2.0059
114.02 -1.8315
114.90 -1.7879
118.02 -1.6333
119.98 -1.5362
120.00 -1.5352
124.93 -1.2910
129.95 -1.0422

134.90 -0.7969
139.98 -0.5452
140.00 -0.5442

COS IS 0.22802

SIN IS -0.47461

BETA IS 0.05512

FOR DEGREE OF 2 COEFFICIENTS ARE

-0.29429E 01 -0.26062E-01 0.31168E-03

100.00 -2.4322
104.93 -2.2498
106.02 -2.2026
109.95 -2.0405
110.50 -2.0170
114.02 -1.8624
114.90 -1.8226
118.02 -1.6774
119.98 -1.5031
120.00 -1.5821
124.93 -1.3342

FOR DEGREE OF 2 COEFFICIENTS ARE

0.69994E 01 -0.23416E 00 0.13862E-02

49.95 -1.2385
54.90 -1.6782
59.98 -2.0588
60.00 -2.0601
64.93 -2.3608
69.95 -2.5977
74.90 -2.7629
79.98 -2.8619
84.93 -2.8894
89.95 -2.8480
96.25 -2.6972
99.98 -2.5560
100.00 -2.5552

COS IS -0.23273

SIN IS -1.02500

BETA IS 0.02785

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.22492E 01 0.15382E 00 -0.38861E-02 0.23238E-04

49.95 -1.3658
54.90 -1.6721
59.98 -1.9894
60.00 -1.9906
64.93 -2.2841
69.95 -2.5507
74.90 -2.7649
79.98 -2.9165
84.93 -2.9804
89.95 -2.9434
96.25 -2.7247
99.98 -2.4918
100.00 -2.4904

COS IS -0.23098

SIN IS -1.03075

BETA IS 0.02428

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.30959E 01 0.19983E 00 -0.48040E-02 0.31217E-04 -0.25545E-07

49.95 -1.3691
54.90 -1.6712
59.98 -1.9875
60.00 -1.9888

COS IS 0.08540
SIN IS -0.04630
BETA IS 0.00075

SECTION--2

X	Y
49.95	-1.3255
54.90	-1.7330
59.98	-2.0231
60.00	-1.9790
64.93	-2.2224
69.95	-2.5410
74.90	-2.8410
79.98	-2.9128
84.93	-2.8721
89.95	-2.9584
96.25	-2.8509
99.98	-2.7463
100.00	-2.1593

0.130000E 02	0.985699E 03	0.783864E 05	0.650114E 07	0.558554E 09
-0.311647E 02	0.985699E 03	0.783864E 05	0.650114E 07	0.558554E 09
0.493801E 11	-0.244417E 04	0.783864E 05	0.650114E 07	0.558554E 09
0.493801E 11	0.446535E 13	-0.199415E 06	0.650114E 07	0.558554E 09
0.493801E 11	0.446535E 13	0.410992E 15	-0.168366E 08	0.558554E 09
0.493801E 11	0.446535E 13	0.410992E 15	0.383528E 17	-0.146288E 10

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.71006E 00 -0.22252E-01

49.95	-1.8216
54.90	-1.9317
59.98	-2.0447
60.00	-2.0452
64.93	-2.1549
69.95	-2.2666
74.90	-2.3767
79.98	-2.4898
84.93	-2.5999
89.95	-2.7116
96.25	-2.8518
99.98	-2.9348
100.00	-2.9353

COS IS -0.22735

SIN IS -0.98062

BETA IS 0.13976

FOR DEGREE OF 2 COEFFICIENTS ARE

0.69994E 01 -0.23416E 00 0.13862E-02

49.95	-1.2385
54.90	-1.6782
59.98	-2.0588
60.00	-2.0601
64.93	-2.3608
69.95	-2.5977
74.90	-2.7629
79.98	-2.8619
84.93	-2.8874
89.95	-2.8400
96.25	-2.6972
99.98	-2.5560
100.00	-2.5552

COS IS -0.23273

SIN IS -1.02500

BETA IS 0.02785

FOR DEGREE OF 3 COEFFICIENTS ARE

12.98	0.5095
20.00	0.5086
24.93	0.2790
29.95	0.0121
34.90	-0.2838
39.98	-0.6212
42.02	-0.7663
46.91	-1.1365
49.95	-1.3827

COS IS 0.08726

SIN IS -0.04478

BETA IS 0.00244

FOR DEGREE OF 3 COEFFICIENTS ARE

0.94910E 00 0.11227E-01 -0.18851E-02 0.14941E-04

4.93	0.9604
9.95	0.8889
14.90	0.7473
19.98	0.5400
20.00	0.5391
24.93	0.2889
29.95	-0.0042
34.90	-0.3201
39.98	-0.6605
42.02	-0.7992
46.91	-1.1303
49.95	-1.3315

COS IS 0.08262

SIN IS -0.04609

BETA IS 0.00116

FOR DEGREE OF 4 COEFFICIENTS ARE

0.11256E 01 -0.33919E-01 0.13935E-02 -0.73965E-04 0.80349E-06

4.93	0.9838
9.95	0.8611
14.90	0.7245
19.98	0.5423
20.00	0.5414
24.93	0.3104
29.95	0.0191
34.90	-0.3130
39.98	-0.6770
42.02	-0.8220
46.91	-1.1435
49.95	-1.3081

RUN:SEQ
188:5

0
SECTION--1

X	Y
4.93	0.9808
9.95	0.8696
14.90	0.7194
19.98	0.5304
20.00	0.5438
24.93	0.3225
29.95	0.0226
34.90	-0.3210
39.98	-0.6518
42.02	-0.8690
46.91	-1.1029
49.95	-1.3255

0.120000E 02	0.338400E 03	0.119407E 05	0.471208E 06	0.197934E 08
-0.281103E 00	0.338400E 03	0.119407E 05	0.471208E 06	0.197934E 08
0.863967E 09	-0.137326E 03	0.119407E 05	0.471208E 06	0.197934E 08
0.863967E 09	0.386842E 11	-0.778169E 04	0.471208E 06	0.197934E 08
0.863967E 09	0.386842E 11	0.176363E 13	-0.381274E 06	0.197934E 08
0.863967E 09	0.386842E 11	0.176363E 13	0.814780E 14	-0.180838E 03

FOR DEGREE OF 1 COEFFICIENTS ARE

0.14984E 01 -0.53966E-01

4.93	1.2324
9.95	0.9614
14.90	0.6943
19.98	0.4202
20.00	0.4191
24.93	0.1530
29.95	-0.1179
34.90	-0.3850
39.98	-0.6591
42.02	-0.7692
46.91	-1.0331
49.95	-1.1972

COS IS 0.09300

SIN IS -0.04906

BETA IS 0.01839

FOR DEGREE OF 2 COEFFICIENTS ARE

0.11100E 01 -0.16827E-01 -0.66218E-03

4.93	1.0110
9.95	0.8770
14.90	0.7123

19.98	0.5095
20.00	0.5086
24.93	0.2790
29.95	0.0121
34.90	-0.2838
39.98	-0.6212
42.02	-0.7663
46.91	-1.1365
49.95	-1.3827

COS IS 0.08726

SIN IS -0.04478

BETA IS 0.00244

FOR DEGREE OF 3 COEFFICIENTS ARE

0.94910E 00 0.11227E-01 -0.18851E-02 0.14741E-04

4.93	0.9604
9.95	0.8889
14.90	0.7473
19.98	0.5400
20.00	0.5391

```

247         TB2=(2.*XF1)*COS(XF1)
248         TB3=TB2+(((XF1**2)-2.)*SIN(XF1))
249         T3=T2+(C1(3)*TB3)
250     ENDIF
251     IF(J.EQ.3)THEN
252         TT5=0.5*T3
253     ENDIF
254     IF((J.NE.2).AND.(J.NE.3))THEN
255         TB4=((3.*(XF1**2))-6.)*COS(XF1)
256         TB5=TB4+(((XF1**3)-(6.*XF1))*SIN(XF1))
257         T4=T3+(C1(4)*TB5)
258     ENDIF
259     IF(J.EQ.4)THEN
260         TT5=0.5*T4
261     ENDIF
262     IF(J.EQ.5)THEN
263         T5=((XF1**4)-(12.*(XF1**2))+24.)*SIN(XF1)
264         T6=((4.*(XF1**3))-(24.*XF1))*COS(XF1)
265         T7=((T5+T6)*C1(5))
266         T8=T4+T7
267         TT5=0.5*T8
268     ENDIF
269     IF(I.EQ.1)THEN
270         SUM2=TT5
271     ENDIF
272     IF(I.EQ.2)THEN
273         SUM1=TT5
274     ENDIF
275     10 CONTINUE
C
276     ALPHA=SUM2-SUM1
277     PRINT ' '
278     PRINT 66,ALPHA
279     66 FORMAT(9X,' COS IS '.F10.5)
280     IF(J.EQ.2)THEN
281         CE3=CE3+ALPHA
282     ENDIF
283     IF(J.EQ.3)THEN
284         CE2=CE2+ALPHA
285     ENDIF
286     IF(J.EQ.4)THEN
287         CE=CE+ALPHA
288     ENDIF
289     IF(J.EQ.5)THEN
290         CE1=CE1+ALPHA
291     ENDIF
292     RETURN
293     END
294     SUBROUTINE SINTEG(XF,XL,J,B1,CL,CL1,CL2,CL3)
295     REAL C1(100),B1(100)
C
296     C1(1)=B1(1)
297     DO 5 K=2,J
298         C1(K)=B1(K)*(57.3**((K-1)))
299     5 CONTINUE
C
300     ALPHA=0.0
301     DO 10 I=1,2
302         IF(I.EQ.1)THEN
303             XF1=XL/57.3
304             ELSE
305             XF1=XF/57.3
306             ENDIF
C
307             T1=C1(1)*(-COS(XF1))
308             TB1=SIN(XF1)-(XF1*COS(XF1))
309             T2=T1+(C1(2)*TB1)
310             IF(J.EQ.2)THEN
311                 TT5=0.5*T2
312             ELSE
313                 TB2=(2.*XF1)*SIN(XF1)
314                 TB3=TB2+(((2.)-(XF1**2))*COS(XF1))
315                 T3=T2+(C1(3)*TB3)
316             ENDIF
317             IF(J.EQ.3)THEN
318                 TT5=0.5*T3
319             ENDIF
320             IF((J.NE.2).AND.(J.NE.3))THEN
321                 TB4=((3.*(XF1**2))-6.)*SIN(XF1)
322                 TB5=TB4+(((6.*XF1)-(XF1**3))*COS(XF1))
323                 T4=T3+(C1(4)*TB5)
324             ENDIF
325             IF(J.EQ.4)THEN
326                 TT5=0.5*T4
327             ENDIF
328             IF(J.EQ.5)THEN
329                 T5=((4.*(XF1**3))-(24.*XF1))*COS(XF1)
330                 T6=((T5+T6)*C1(5))
331                 T8=T4+T7
332                 TT5=0.5*T8
333             ENDIF
334             CE3=CE3+ALPHA
335             CE2=CE2+ALPHA
336             CE=CE+ALPHA
337             CE1=CE1+ALPHA
338             RETURN
339             END

```

284.93	-2.9085
289.95	-2.7348
294.90	-2.4955
300.00	-2.1767
304.93	-1.7971
309.95	-1.3371

COS IS -0.24399

SIN IS 1.08591

BETA IS 0.00529

FOR DEGREE OF 4 COEFFICIENTS ARE

0.16267E 01 0.75734E-01 -0.27532E-03 -0.19694E-05 0.63405E-08

260.00	-2.8976
264.93	-2.9796
269.95	-3.0215
274.90	-3.0181
279.98	-2.9646
280.00	-2.9643
284.93	-2.8602
289.95	-2.6974
294.90	-2.4771
300.00	-2.1836
304.93	-1.8317
309.95	-1.4002

COS IS -0.24343

SIN IS 1.08374

BETA IS 0.00506

SECTION-7

X	Y
309.95	-1.4258
314.90	-1.1091
319.98	-0.6623
320.00	-0.7666
324.93	-0.3804
329.95	-0.0443
334.90	0.2482
339.98	0.5085
340.00	0.4654
344.93	0.7019
349.95	0.8582
354.90	0.9487
359.98	0.9937

0.130000E 02	0.434435E 04	0.145479E 07	0.488166E 09	0.164143E 12
0.336103E 00	0.434435E 04	0.145479E 07	0.488166E 09	0.164143E 12
0.553042E 14	0.264441E 03	0.145479E 07	0.488166E 09	0.164143E 12

0.553042E 14	0.186710E 17	0.139033E 06	0.488166E 09	0.164143E 12
0.553042E 14	0.186710E 17	0.631595E 19	0.633965E 08	0.164143E 12
0.553042E 14	0.186710E 17	0.631595E 19	0.214073E 22	0.268674E 11

FOR DEGREE OF 1 COEFFICIENTS ARE

-0.16965E 02 0.50843E-01

309.95	-1.2061
314.90	-0.9544
319.98	-0.6961
320.00	-0.6951
324.93	-0.4445
329.95	-0.1892
334.90	0.0624
339.98	0.3207
340.00	0.3217
344.93	0.5724
349.95	0.8276
354.90	1.0793
359.98	1.3376

COS IS 0.05899

SIN IS 0.06002

BETA IS 0.03154

CD = 0.53059

CL = 0.14095

FOR DEGREE OF 2 COEFFICIENTS ARE

0.40378E 03 -0.24668E 01 0.37584E-02

309.95	0.2720
314.90	-0.3135
319.98	-0.7231
320.00	-0.7244
324.93	-0.9358
329.95	-0.9631
334.90	-0.8047
339.98	-0.4504
340.00	-0.4485
344.93	0.0811
349.95	0.8083
354.90	1.7109
359.98	2.8289

COS IS 0.01991

SIN IS 0.07910

BETA IS 1.18737

CD = 0.47831

CL = 0.13153

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.32500E 02 -0.28570E-02 0.73895E-03 -0.13105E-05

309.95	-1.4192
314.90	-1.0475
319.98	-0.6914
320.00	-0.6900
324.93	-0.3701
329.95	-0.0714
334.90	0.1957
339.98	0.4404
340.00	0.4413
344.93	0.6491
349.95	0.8299
354.90	0.9767
359.98	1.0939

COS IS 0.04483

SIN IS 0.05601

CD = 0.47031

CL = 0.13153

FOR DEGREE OF 3 COEFFICIENTS ARE

-0.32500E 02 -0.28570E-02 0.73895E-03 -0.13105E-05

309.95	-1.4192
314.90	-1.0475
319.98	-0.6914
320.00	-0.6900
324.93	-0.3701
329.95	-0.0714
334.90	0.1957
339.98	0.4404
340.00	0.4413
344.93	0.6491
349.95	0.8299
354.90	0.9767
359.98	1.0939

COS IS 0.06483

SIN IS 0.05681

BETA IS 0.00375

CD = 0.51814

CL = 0.10625

FOR DEGREE OF 4 COEFFICIENTS ARE

-0.18050E 02 -0.42054E-01 0.17407E-03 0.15676E-05 -0.36601E-08

309.95	-1.4655
314.90	-1.0732
319.98	-0.6972
320.00	-0.6958
324.93	-0.3591
329.95	-0.0471
334.90	0.2277
339.98	0.4733
340.00	0.4742
344.93	0.6747
349.95	0.8380
354.90	0.9561
359.98	1.0303

COS IS 0.06646

SIN IS 0.05631

BETA IS 0.00173

CD = 0.53922

CL = 0.08604

END OF RUN:SEQ 188:5

APPENDIX B

STEADY PRESSURE DATA PLOTS

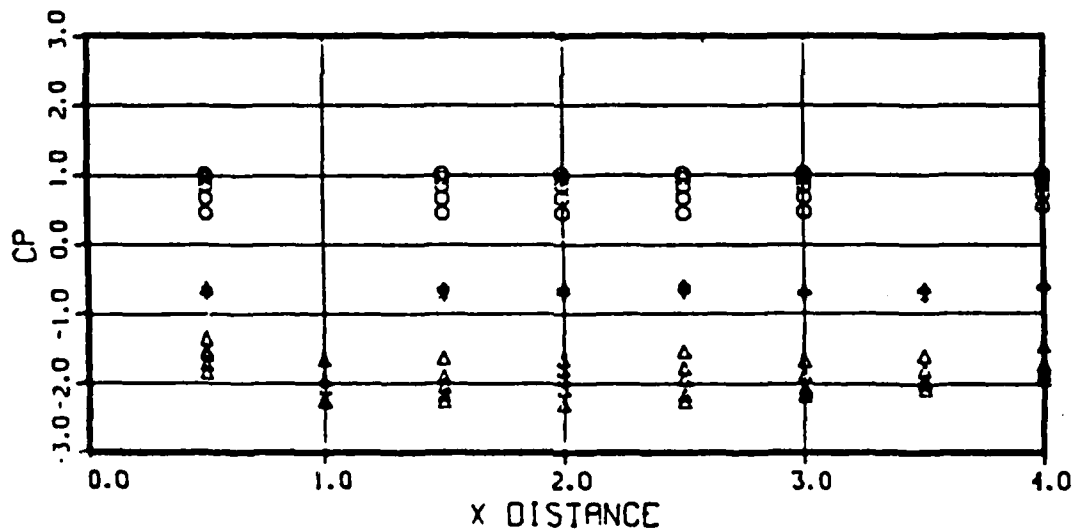
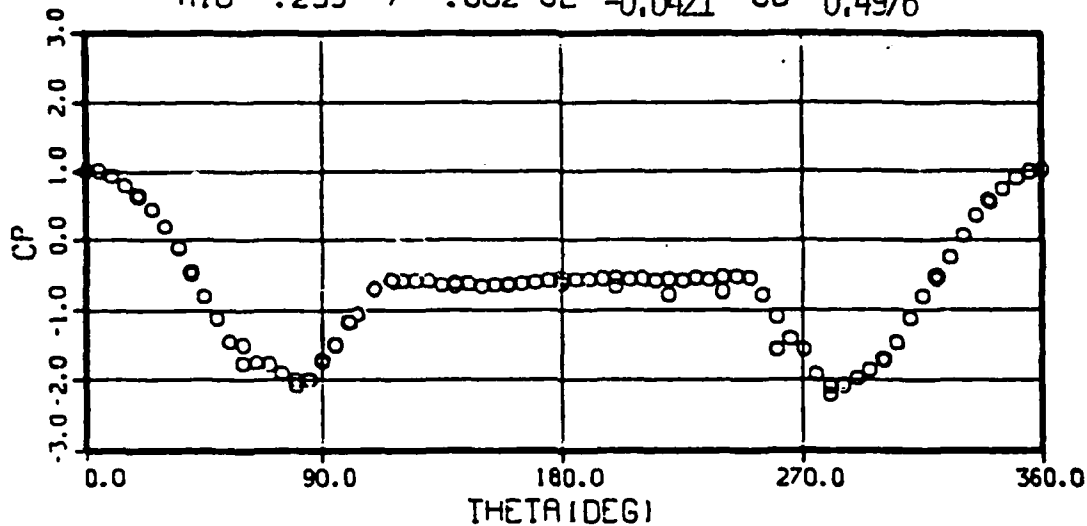
FOR

SMOOTH & ROUGH CYLINDERS

TESTS

SMOOTH CYLINDER

RUN 005 OIU-387.8 +/- 3.48 RNDIU-7.760 +/- .122
 PIU- 9994. +/- 41.40 VIU-268.48 +/- 1.624
 MIU- .235 +/- .002 CL- -0.0421 CD- 0.4976



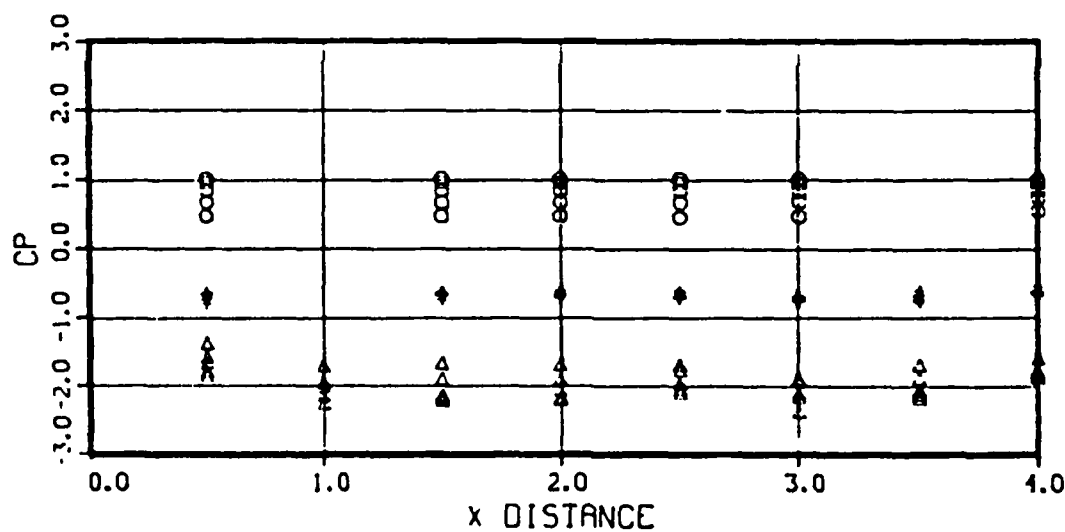
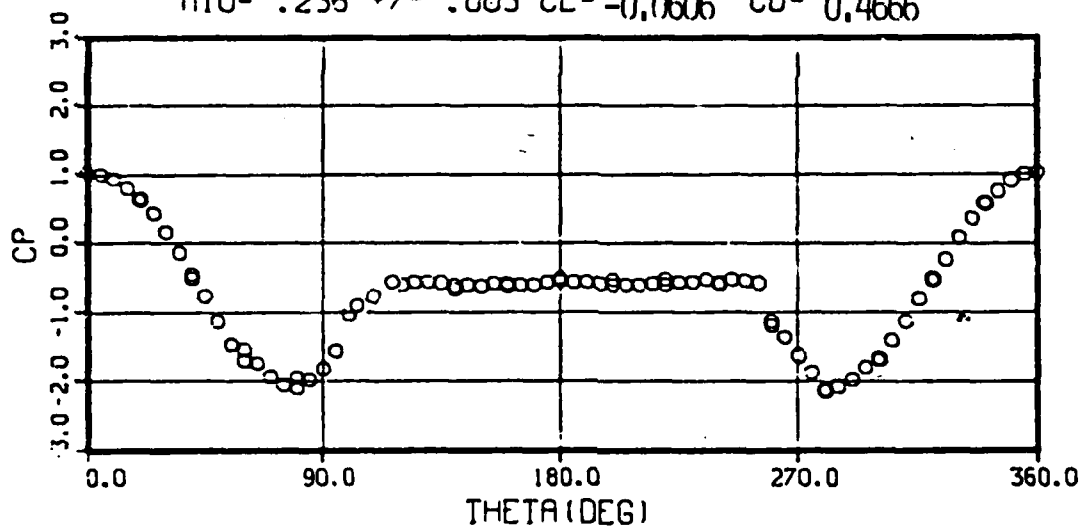
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 006 OIU-343.7 +/- 7.70 RNDIU-6.798 +/- .082

PIU- 8775. +/- 38.20 VIU-270.50 +/- 2.860

MIU- .236 +/- .003 CL- -0.0606 CD- 0.4666



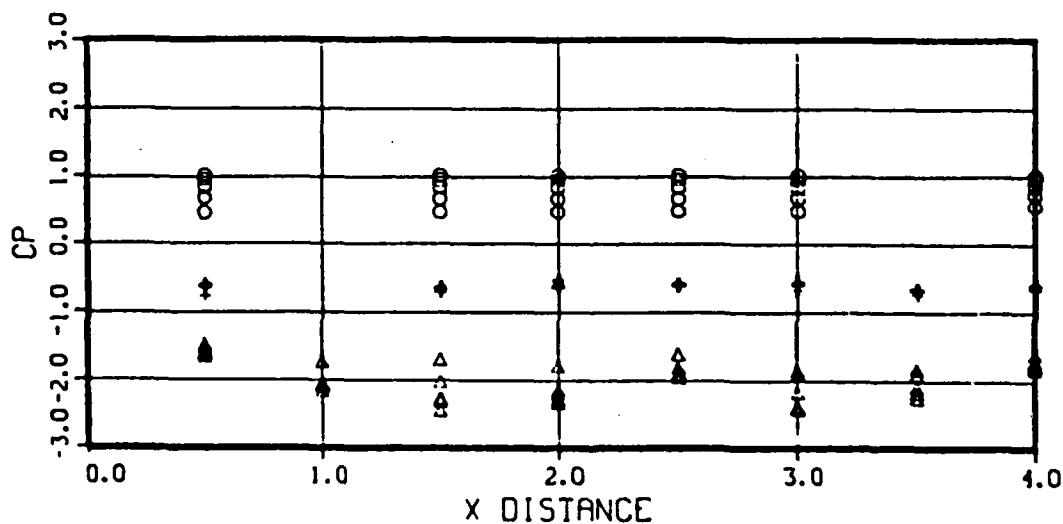
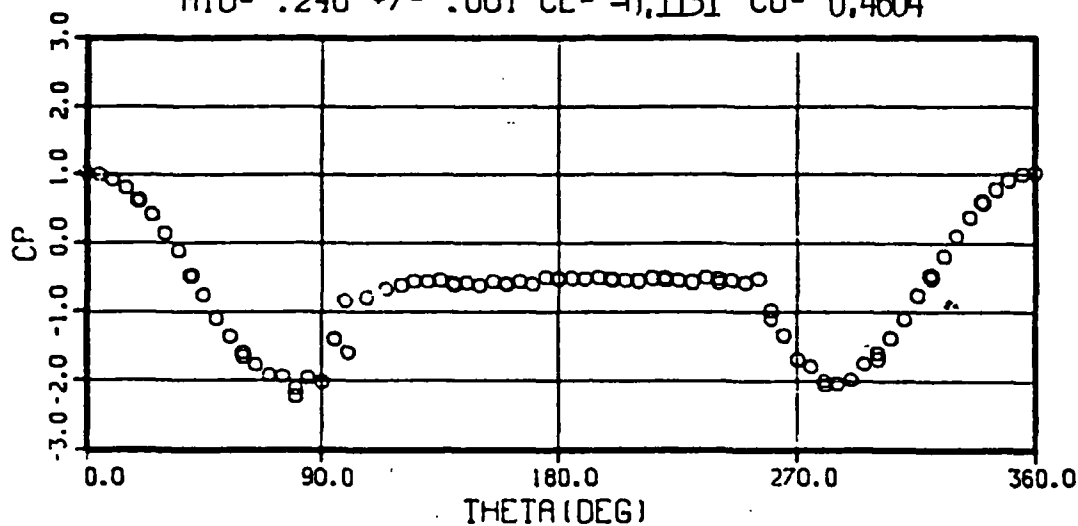
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 007 01U-305.1 +/- 3.36 RND1U-5.907 +/- .034

PIU- 7549. +/- 17.00 VIU-275.39 +/- 2.566

MIU- .240 +/- .001 CL- -0.1131 CD- 0.4604



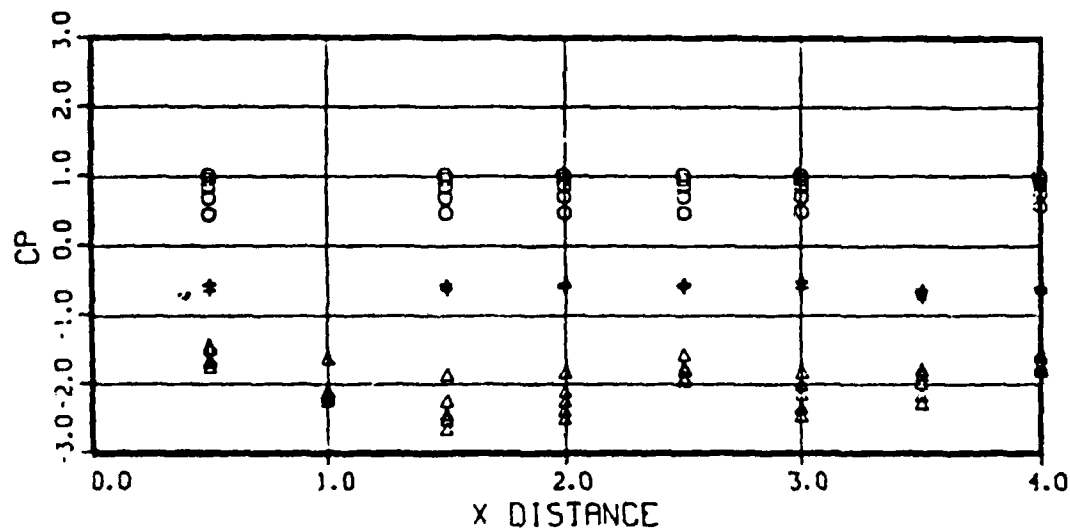
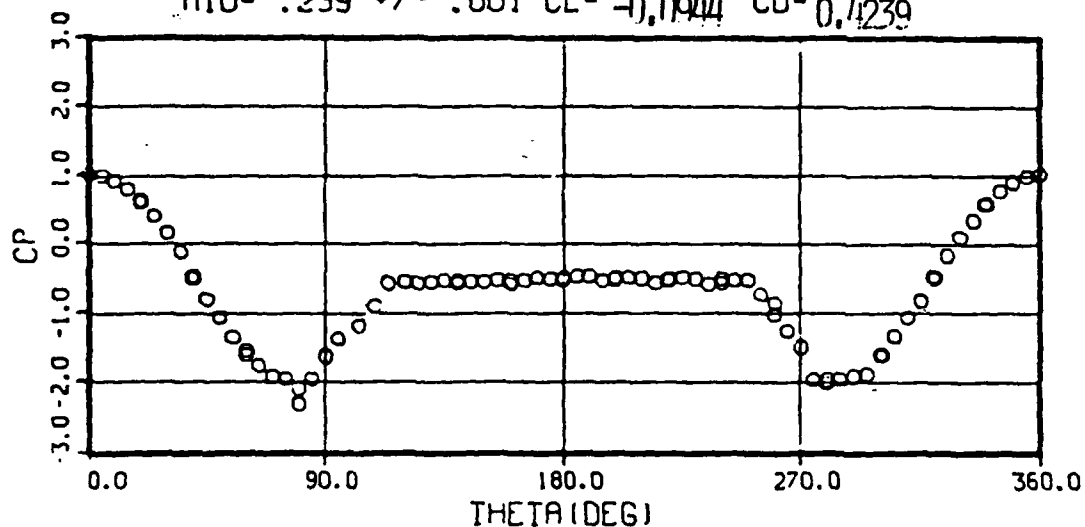
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 008 OIU-254.0 +/- 2.24 RNDIU-4.929 +/- .023

PIU- 6331. +/- 1.80 VIU-274.53 +/- 1.190

MIU- .239 +/- .001 CL- -0.0944 CD- 0.1239



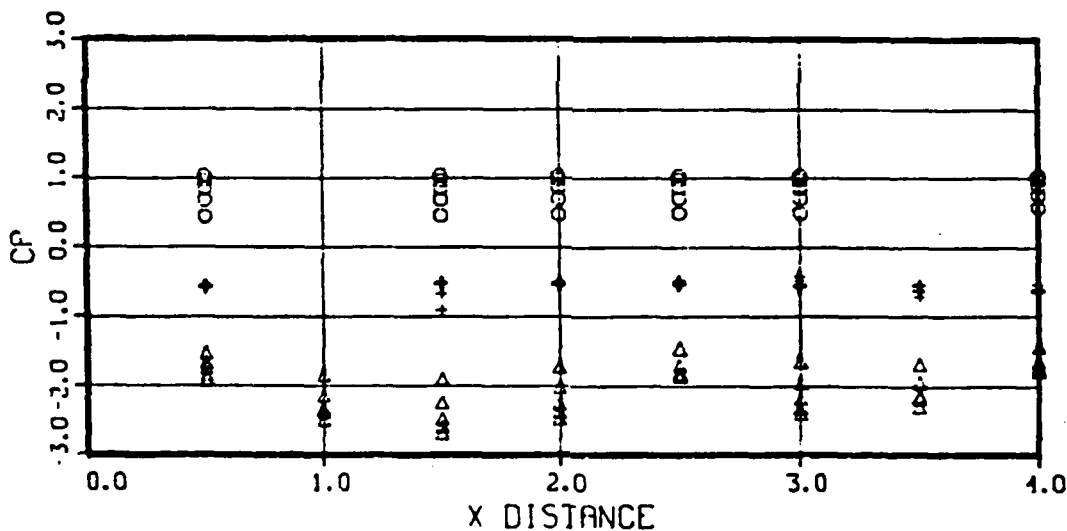
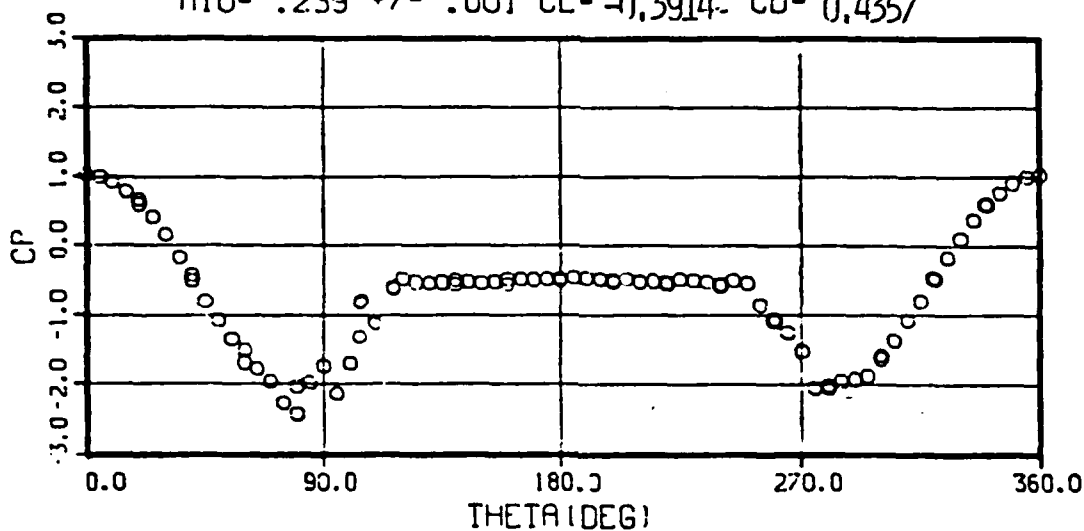
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 009 OIU-200.8 +/- 1.26 RNDIU-3.934 +/- .030

PIU- 5020. +/- 31.60 VIU-273.23 +/- .896

MIU- .239 +/- .001 CL- -0.3914 CD- 0.4357



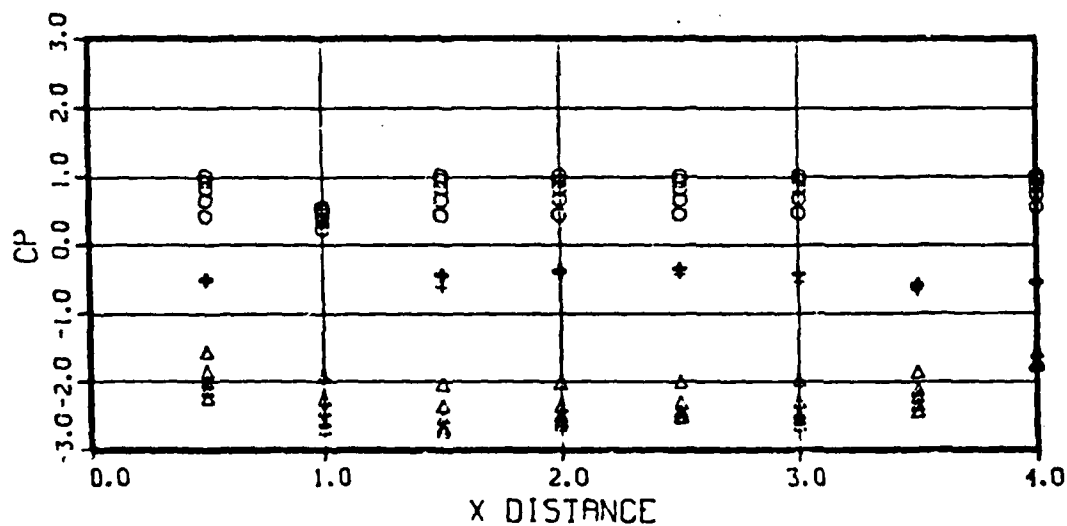
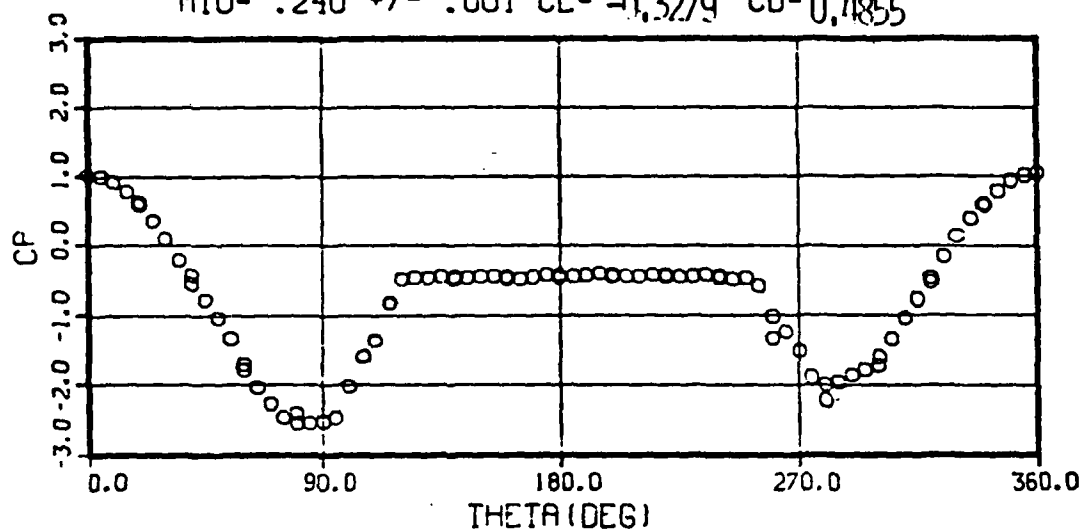
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 012 01U-151.2 +/- .70 RND1U-2.987 +/- .030

PIU- 3737. +/- 10.60 VIU-273.30 +/- .784

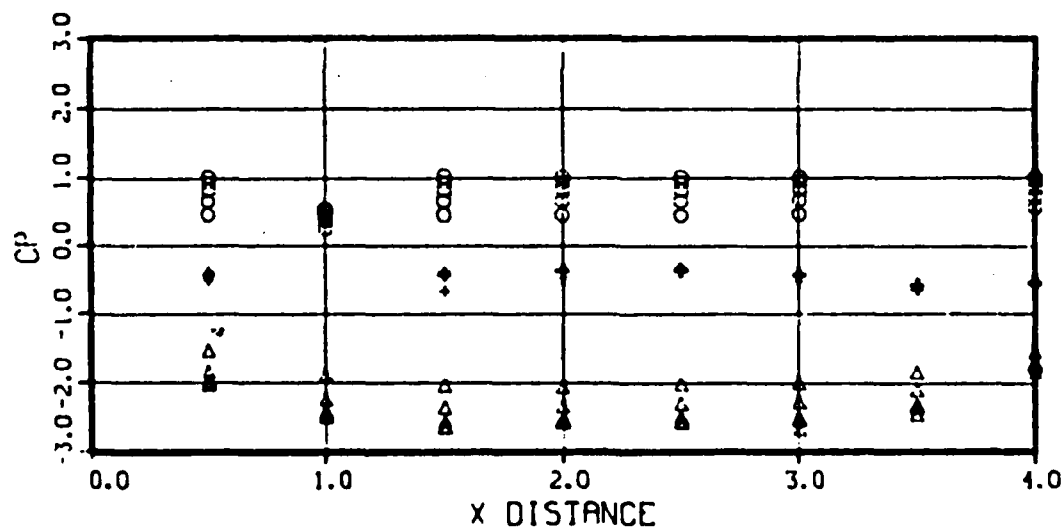
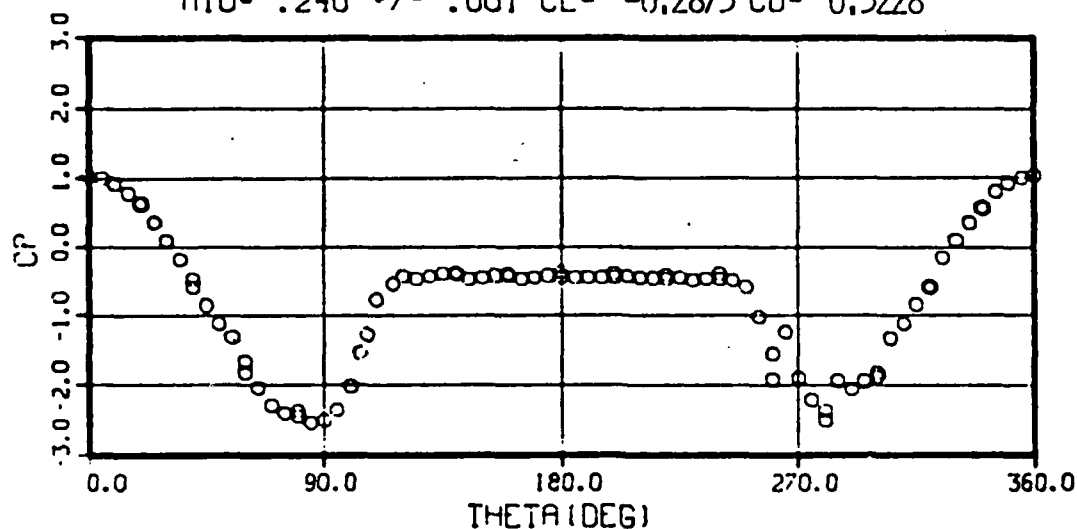
MIU- .240 +/- .001 CL- -0.3279 CD-0.4855



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

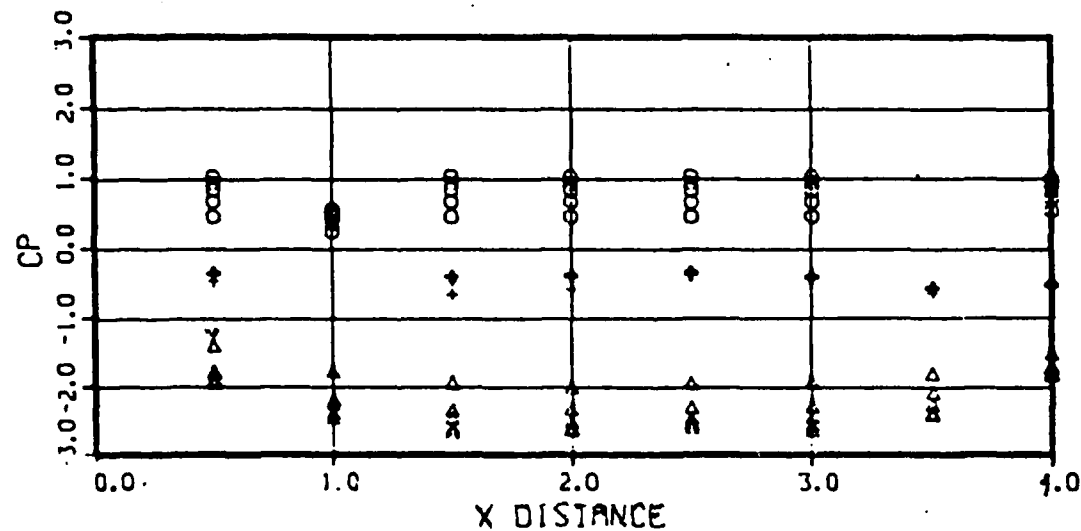
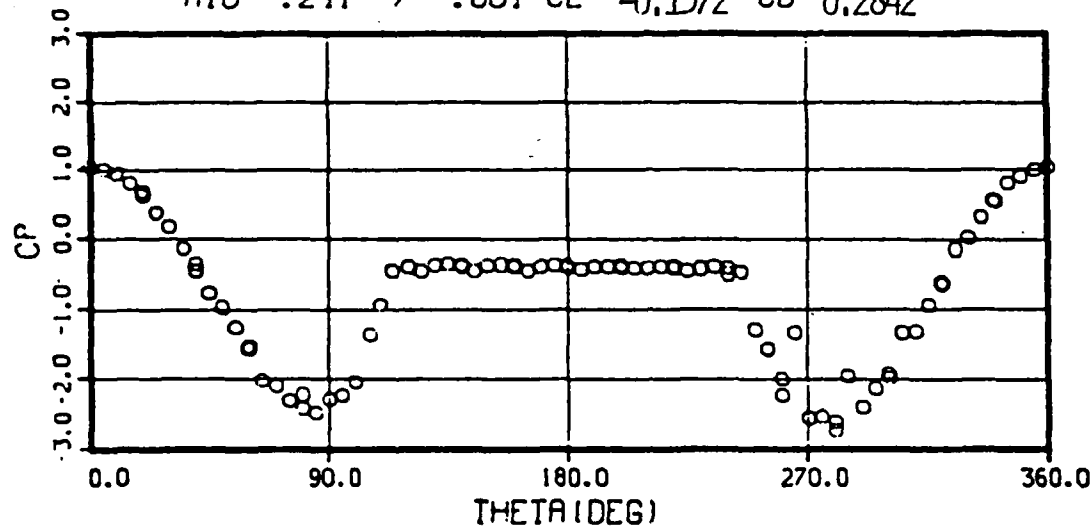
RUN 013 OIU-127.7 +/- .84 RNDIU-2.523 +/- .008
 PIU- 3170. +/- 6.00 VIU-272.80 +/- 1.044
 MIU- .240 +/- .001 CL- -0.2873 CD- 0.3228



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 014 OIU-100.9 +/- .56 RNDIU-1.991 +/- .018
 PIU- 2485. +/- 6.60 VIU-273.79 +/- .260
 MIU- .241 +/- .001 CL- -0.1372 CD-0.2842



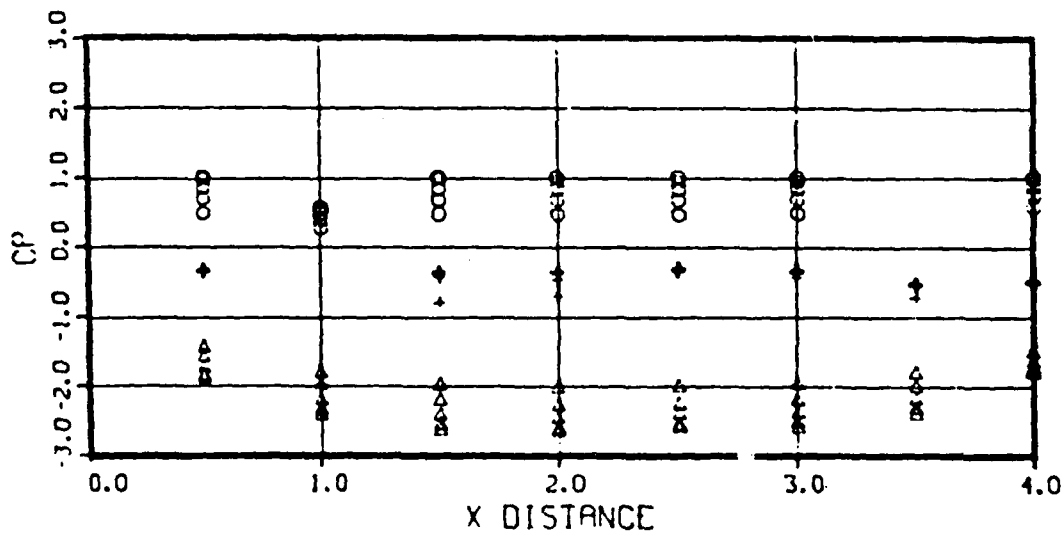
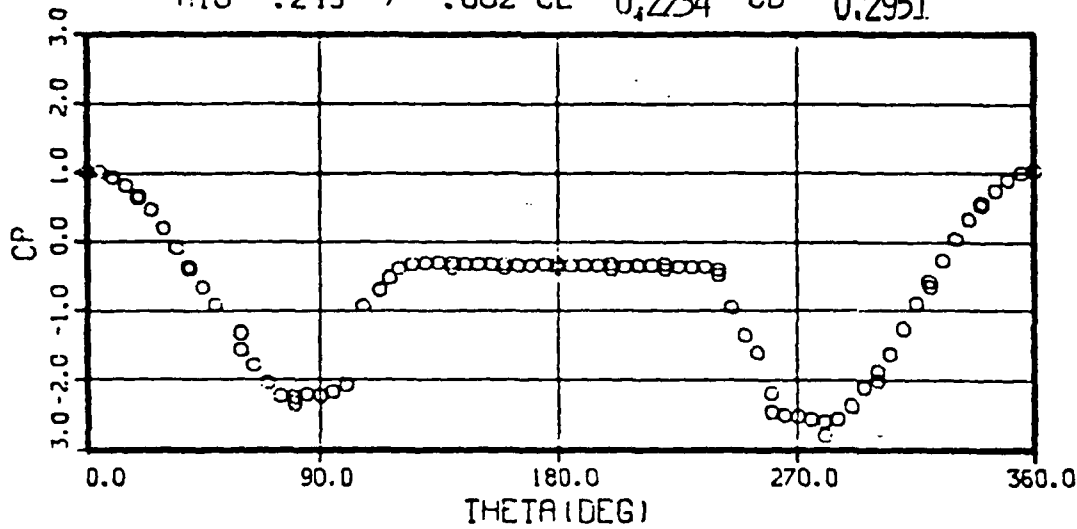
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 015 OIU- 77.0 +/- 1.12 RNDIU-1.510 +/- .010

PIU- 1872. +/- 1.80 VIU-275.60 +/- 2.016

MIU- .243 +/- .002 CL- 0.2234 CD- 0.2951



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

AD-A160 351

ANALYSIS OF FLUID FLOW AT VERY HIGH REYNOLDS NUMBER
AROUND SMOOTH & ROUGH. (U) ALABAMA A AND M UNIV NORMAL
DEPT OF PHYSICS S S MURTY ET AL. JUL 85

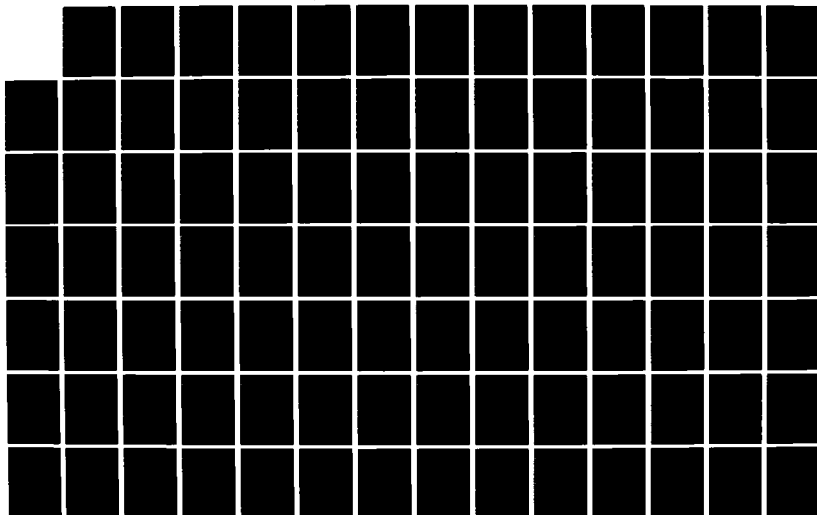
2/3

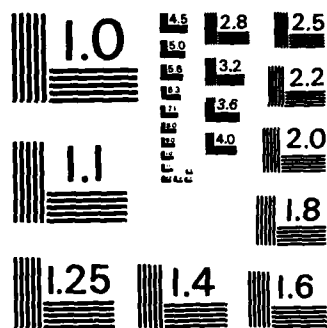
UNCLASSIFIED

N00014-83-K-0351

F/G 20/4

NL

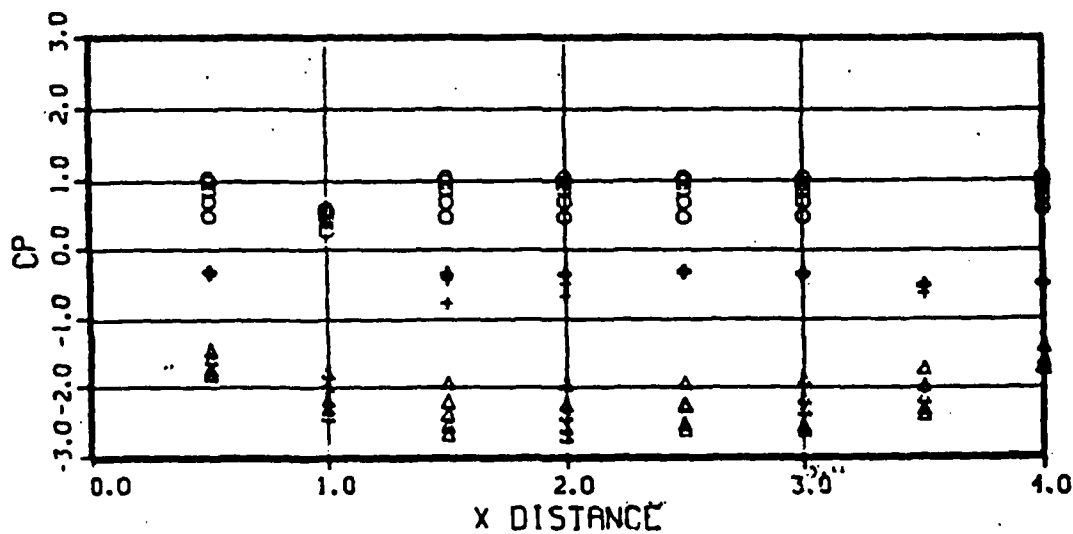
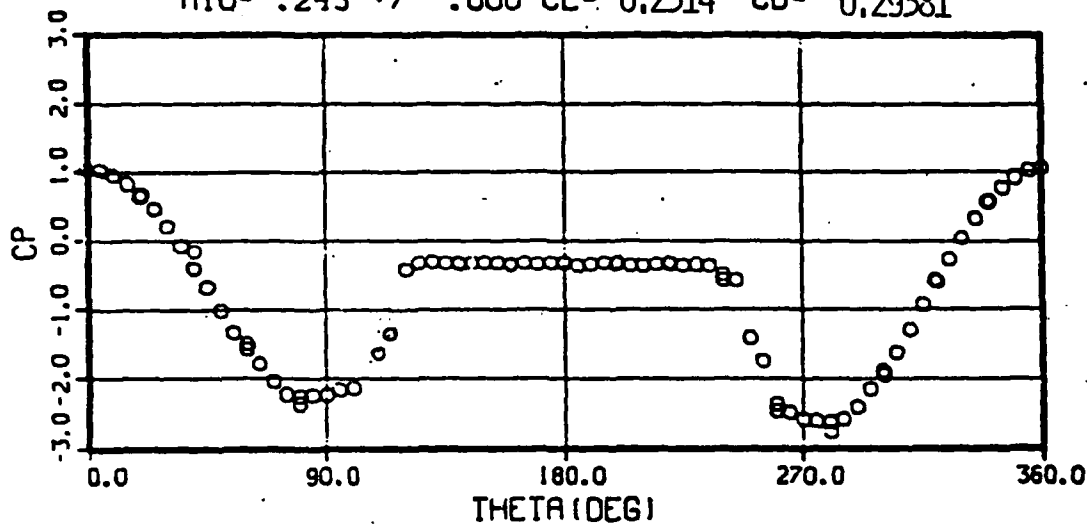




MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

SMOOTH CYLINDER

RUN 016 OIU- 64.6 +/- .00 RNDIU-1.266 +/- .001
 PIU- 1566. +/- 3.20 VIU-275.61 +/- .098
 MIU- .243 +/- .000 CL- 0.2314 CD- 0.29381



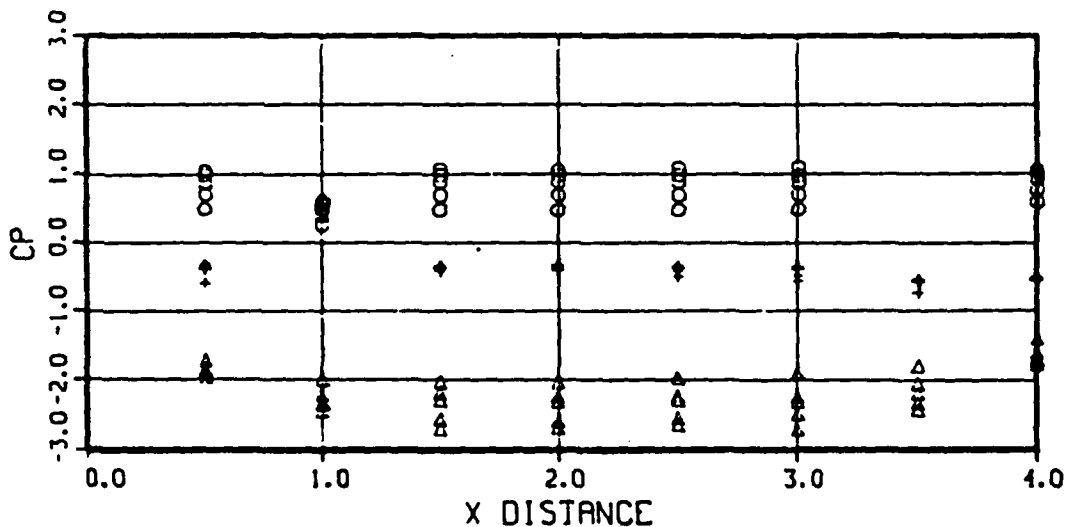
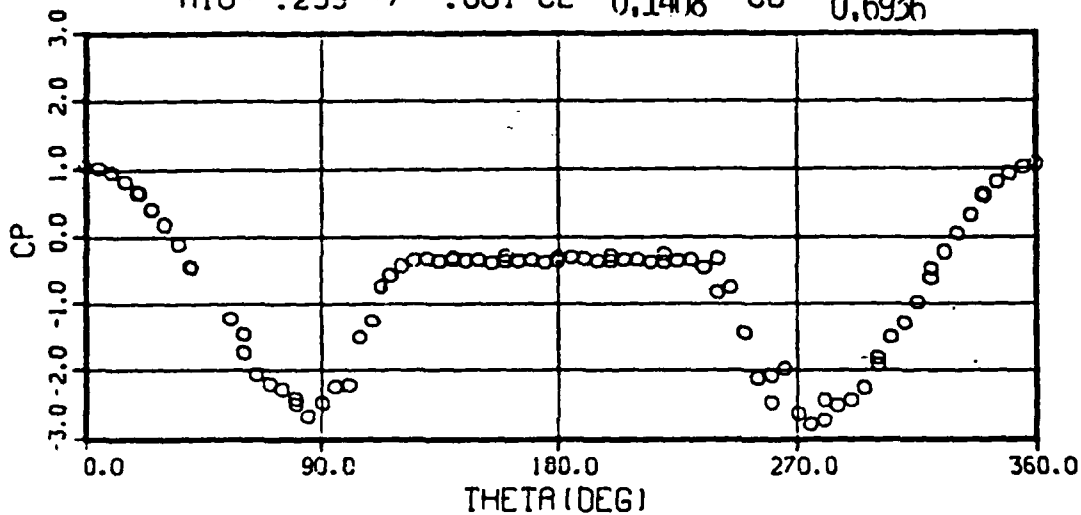
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 017 OIU- 50.4 +/- .00 RNDIU-1.004 +/- .001

PIU- 1255. +/- 9.20 VIU-271.75 +/- .446

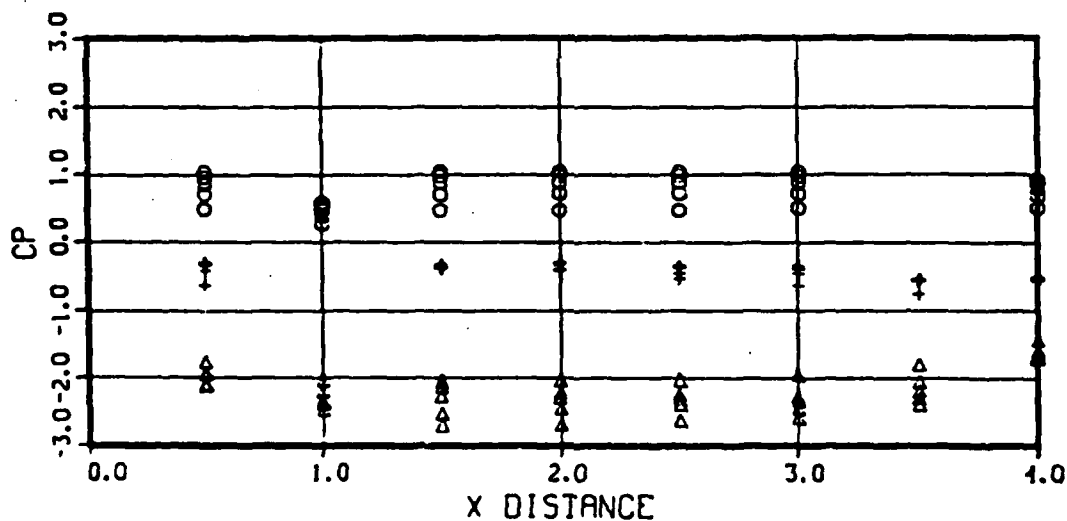
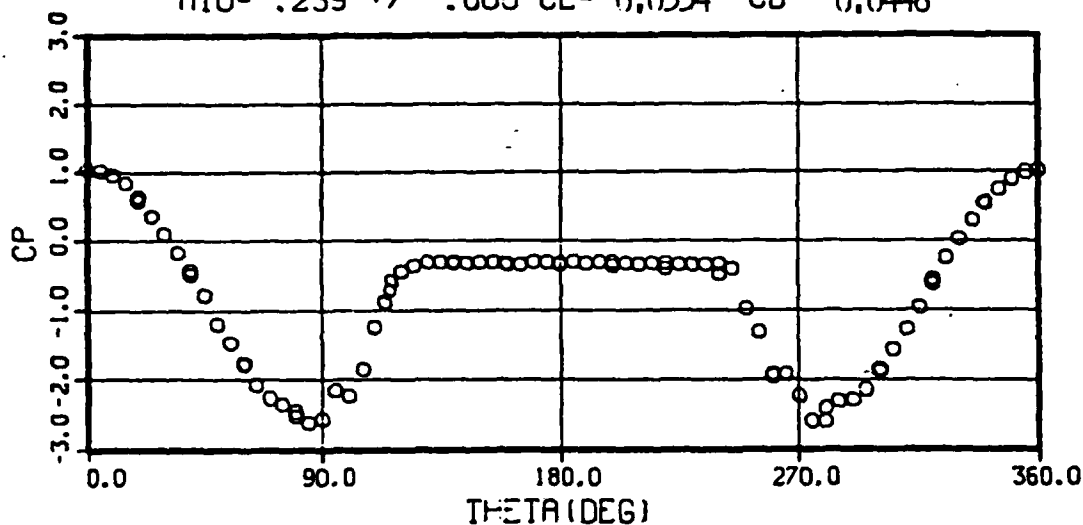
MIU- .239 +/- .001 CL- 0.1408' CD- 0.6936



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-- 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

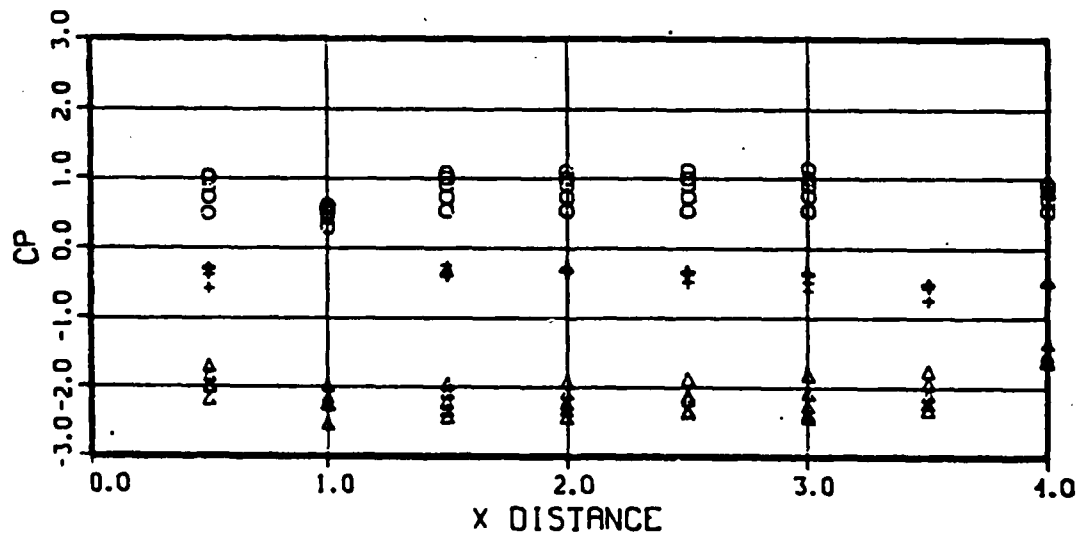
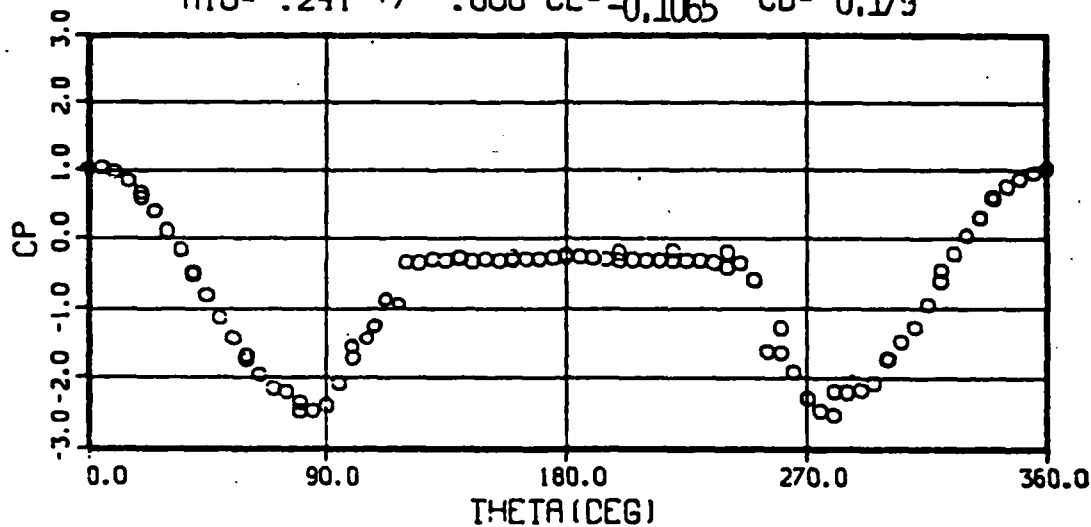
RUN 018 OIU- 44.7 +/- .00 RNDIU- .891 +/- .000
 PIU- 1115. +/- 2.20 VIU-271.61 +/- .192
 MIU- .239 +/- .000 CL- 0.0554 CD- 0.6448



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 019 OIU- 40.7 +/- .20 RNDIU- .807 +/- .003
 PIU- 1000. +/- 3.00 VIU-273.44 +/- .620
 MIU- .241 +/- .000 CL- -0.1065 CD- 0.179



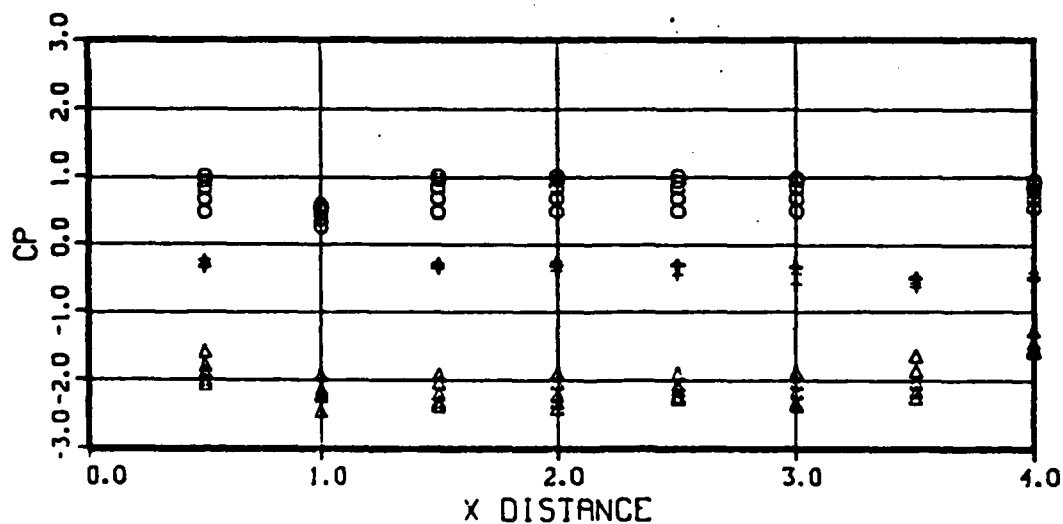
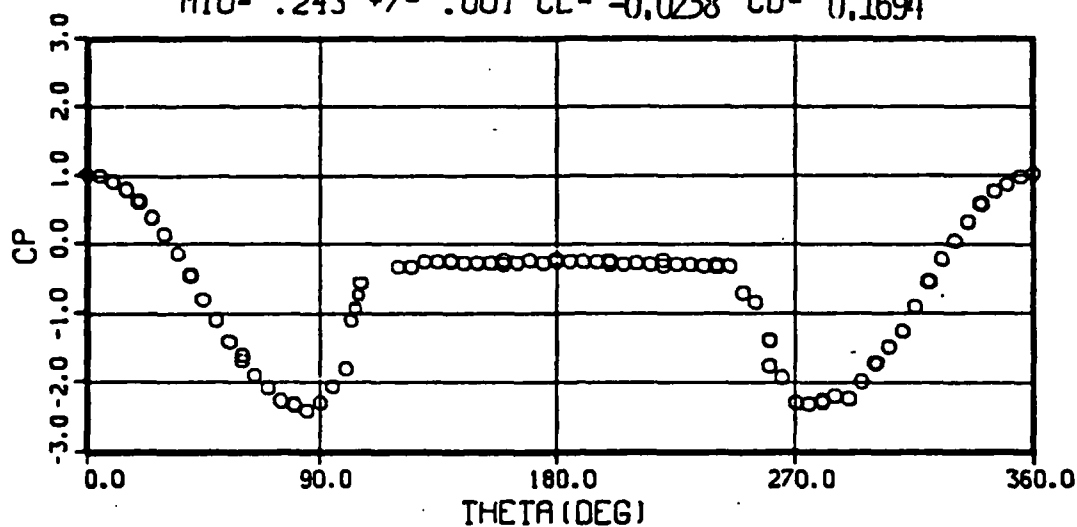
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 020 OIU- 35.3 +/- .06 RNDIU- .695 +/- .001

PIU- 855. +/- 4.00 VIU- 274.96 +/- .586

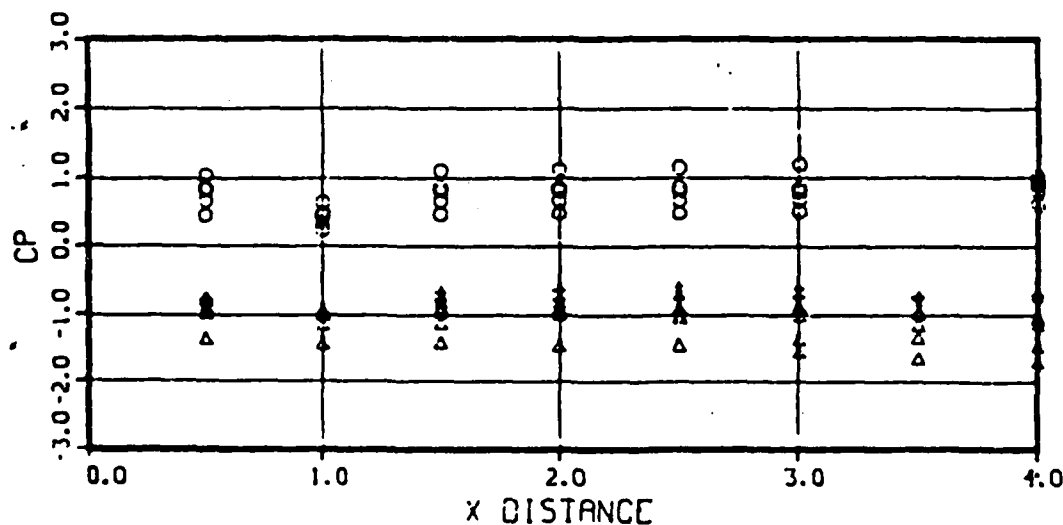
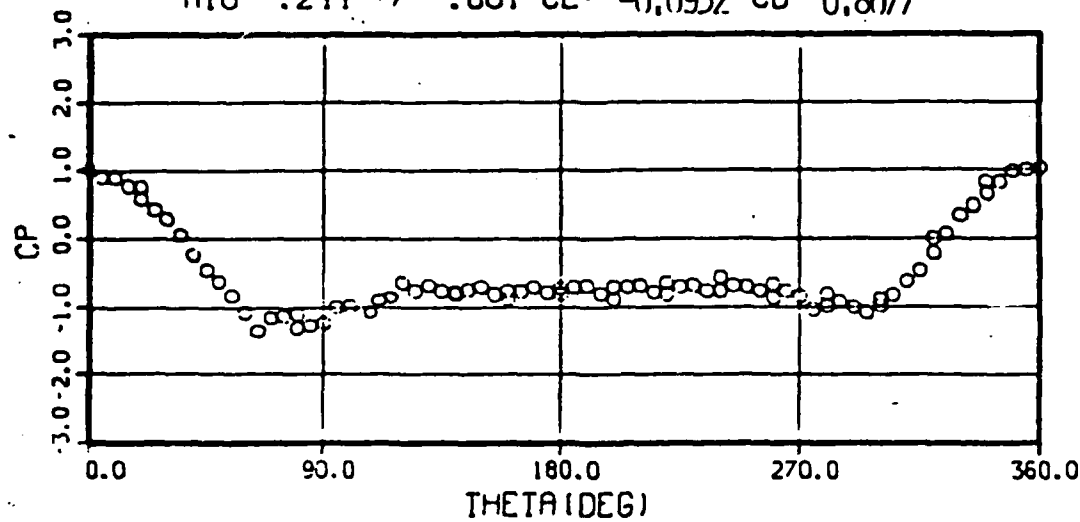
MIU- .243 +/- .001 CL- -0.0238 CD- 0.1694



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

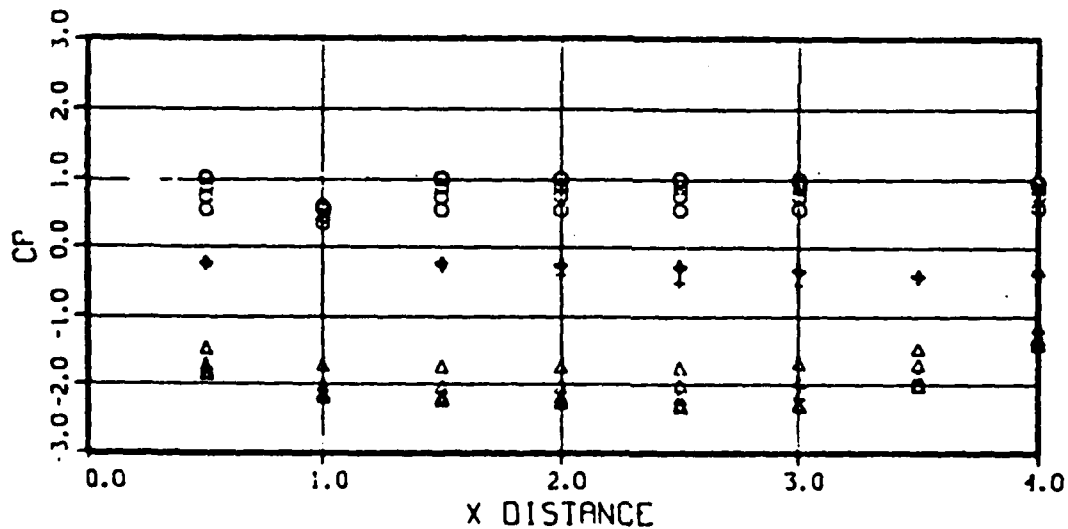
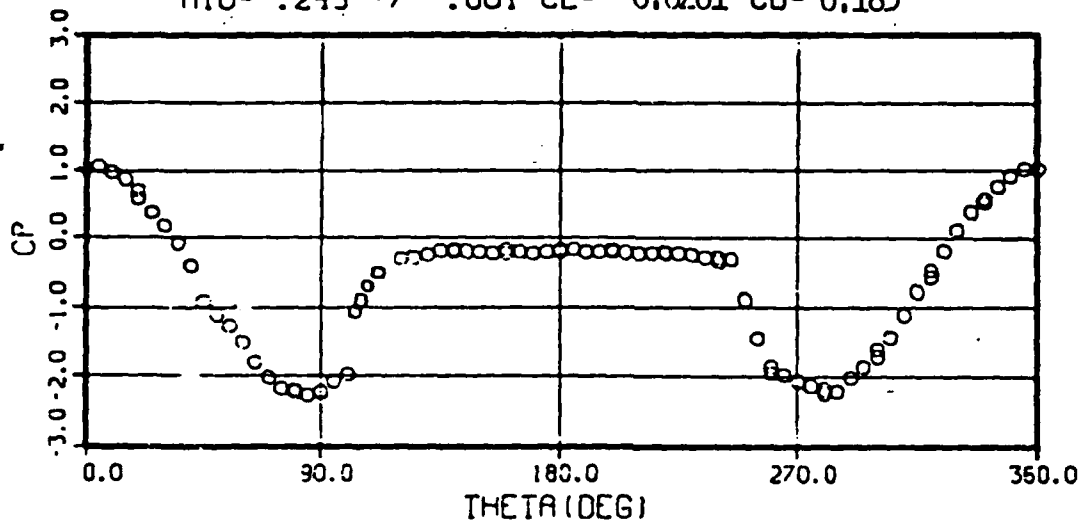
RUN 021 OIU- 20.7 +/- .46 RNDIU- .407 +/- .005
 PIU- 495. +/- 6.20 VIU-275.97 +/- 1.664
 MIU- .244 +/- .001 CL- -0.0932 CD- 0.8077



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-- 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

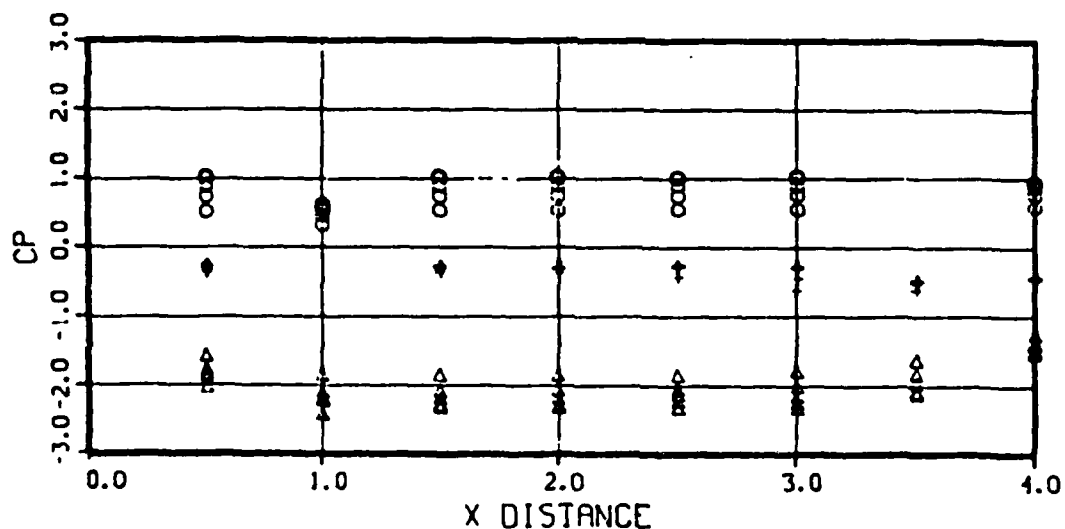
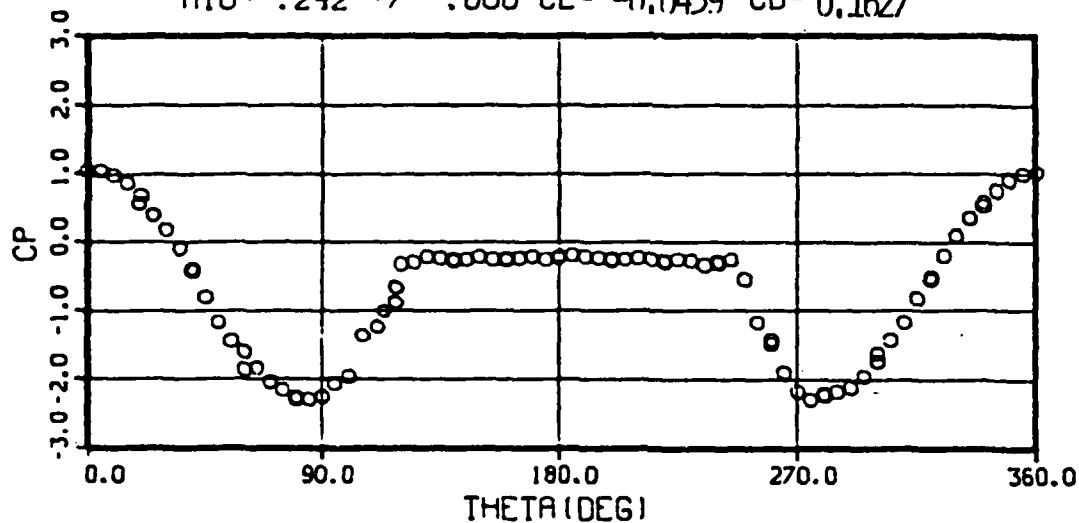
RUN 022 OIU- 25.8 +/- .00 RNDIU- .507 +/- .003
 PIU- 621. +/- 2.20 VIU-275.84 +/- .652
 MIU- .243 +/- .001 CL- -0.0261 CD- 0.183



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

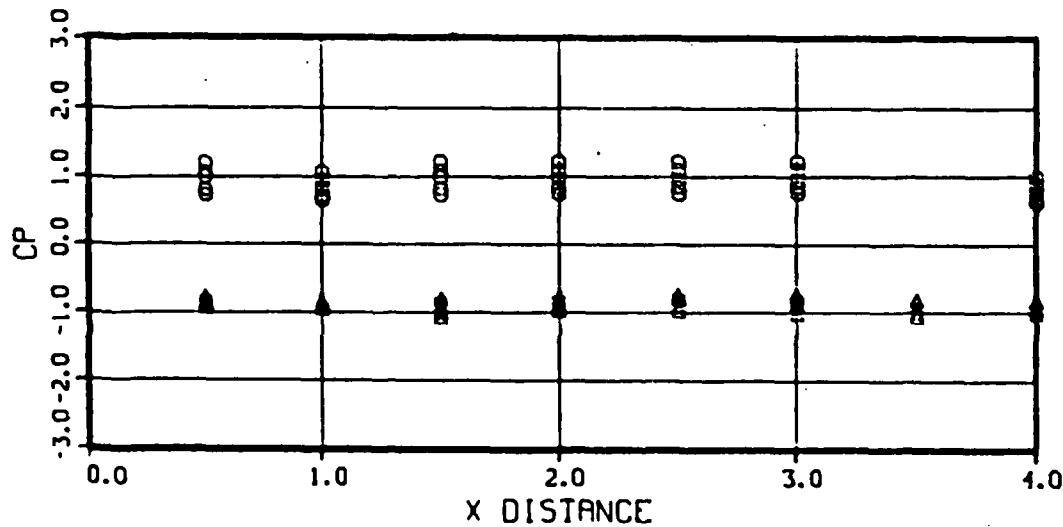
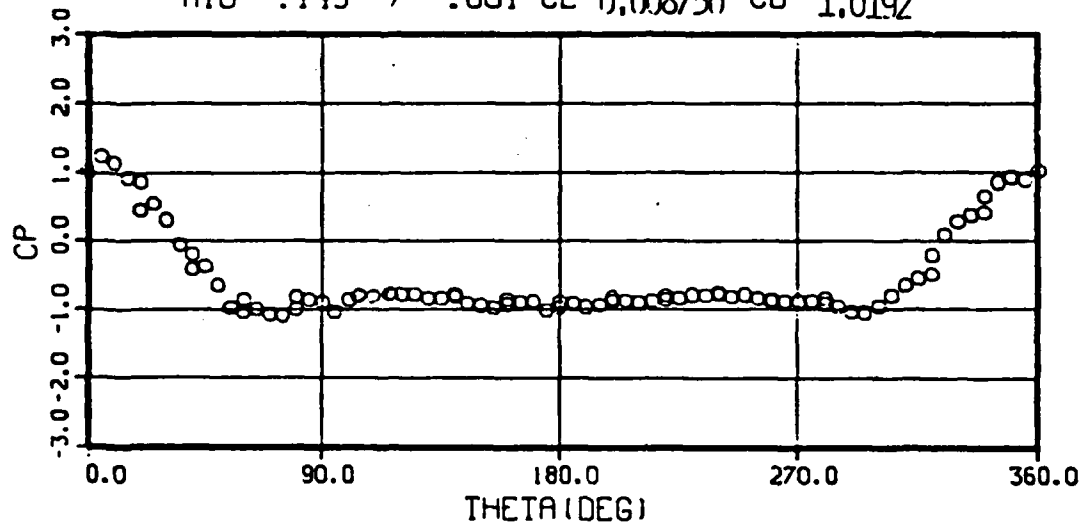
RUN 023 OIU- 30.7 +/- .00 RNDIU- .606 +/- .003
 PIU- 748. +/- 1.60 VIU-274.45 +/- .358
 MIU- .242 +/- .000 CL- -0.0439 CD- 0.1627



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 033 OIU- 9.0 +/- .00 RNDIU- .304 +/- .002
 PIU- 614. +/- 2.40 VIU-162.43 +/- .350
 MIU- .145 +/- .001 CL-0.008750 CD-1.0192



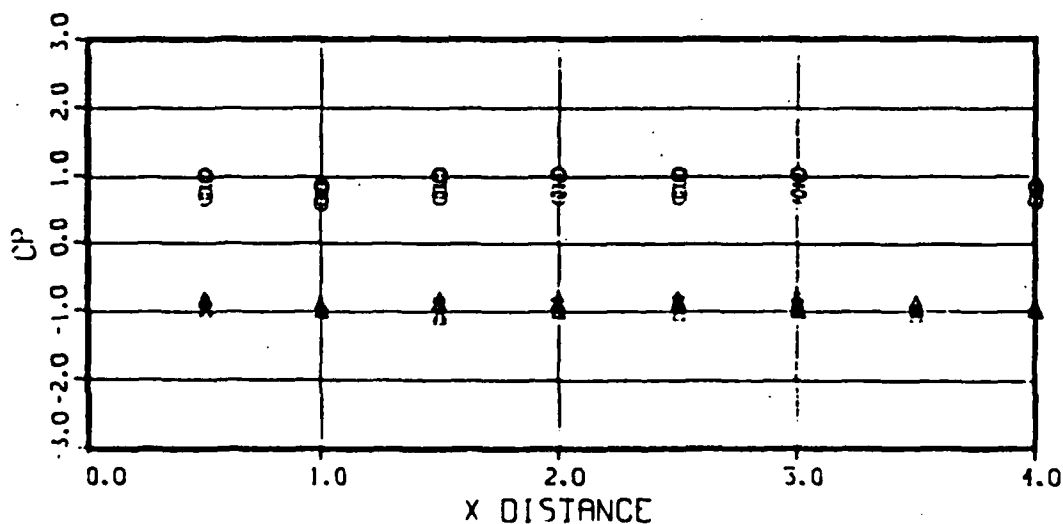
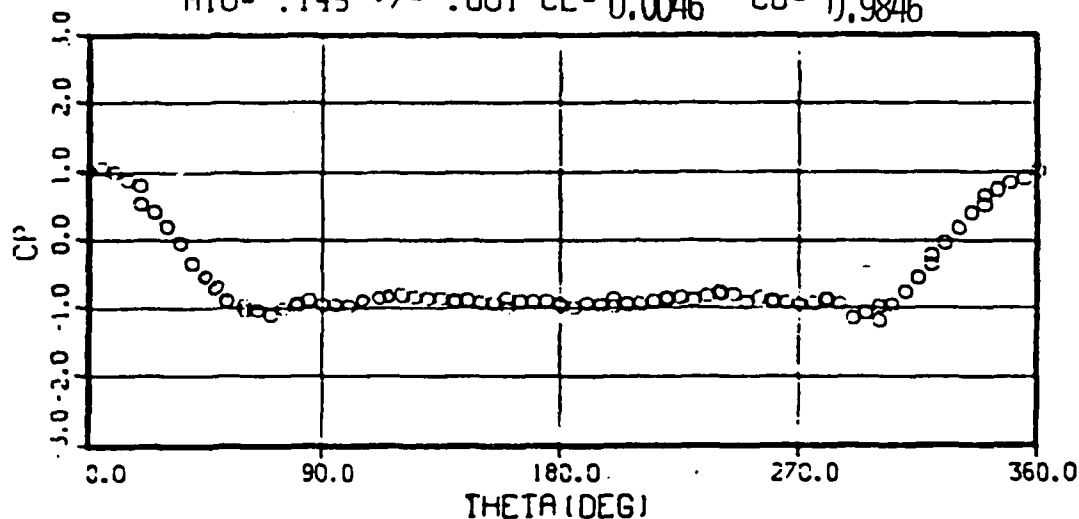
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 034 OIU- 9.1 +/- .12 RNDIU- .309 +/- .003

PIU- 623. +/- 4.80 VIU-162.53 +/- .260

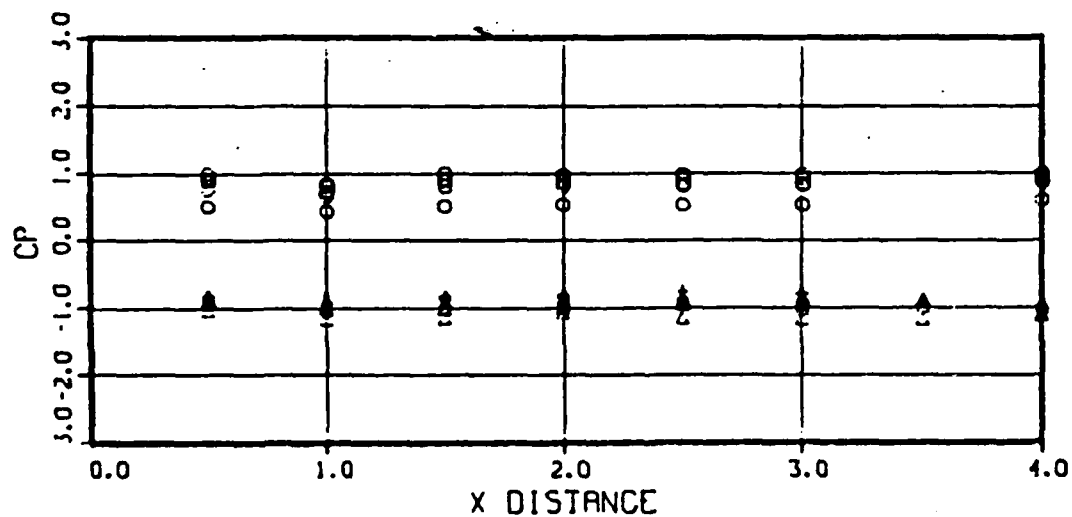
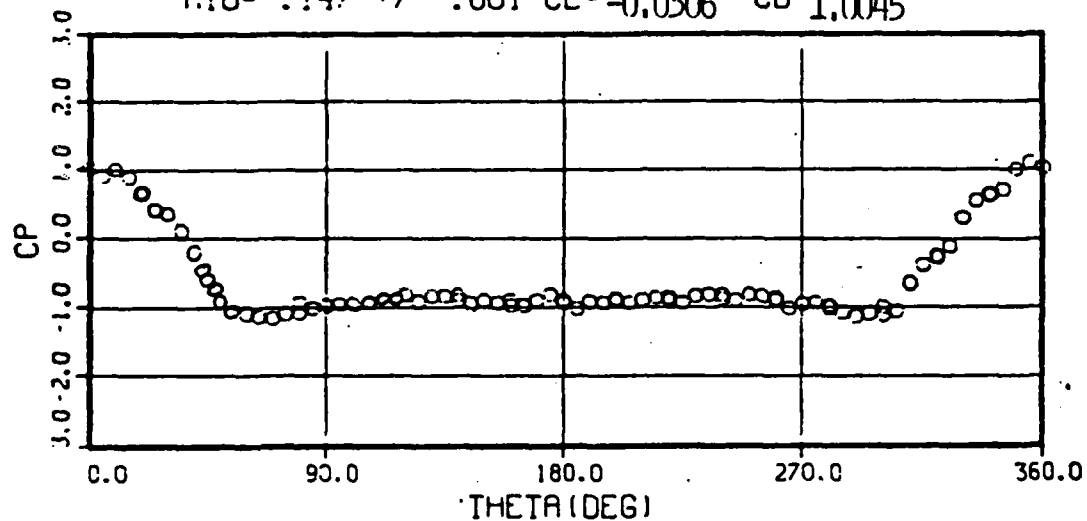
MIU- .145 +/- .001 CL-0.0046 CD- 0.9846



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

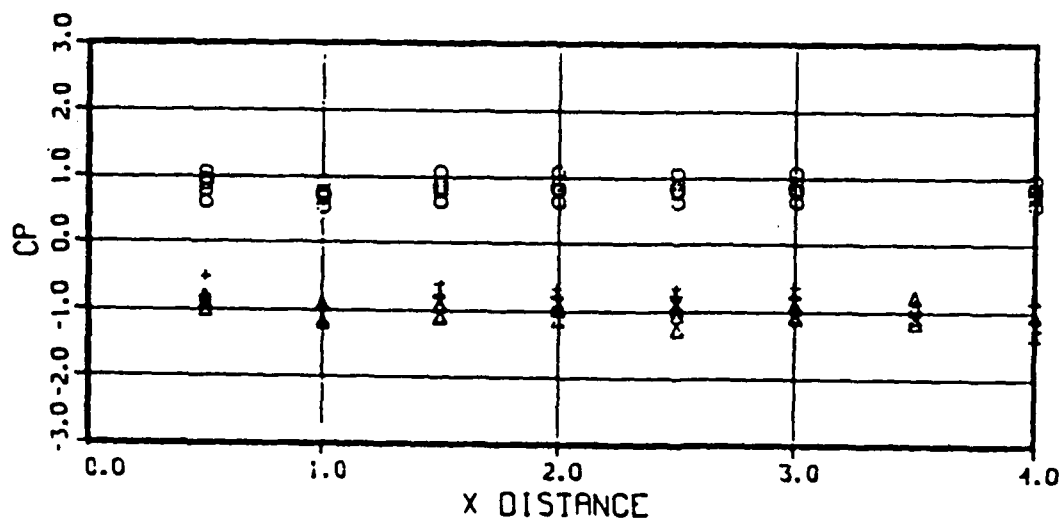
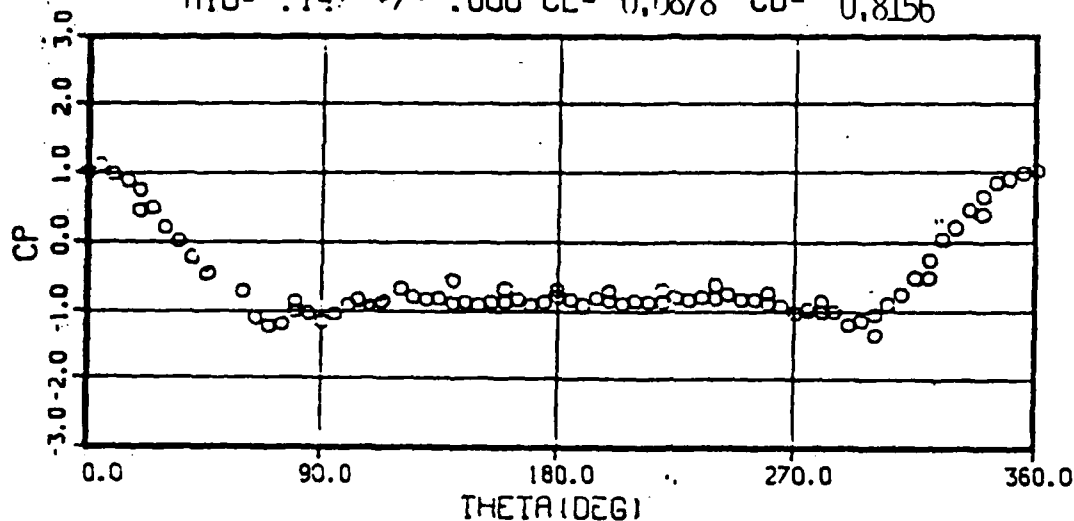
RUN 035 CIU- 9.8 +/- .12 RNDIU- .325 +/- .003
 PIU- 648. +/- 5.80 VIU-164.90 +/- .334
 MIU- .147 +/- .001 CL- -0.0306 CD-1.0045



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 036 OIU- 10.6 +/- .06 RNDIU- .354 +/- .002
 PIU- 704. +/- 2.60 VIU-155.28 +/- .234
 MIU- .147 +/- .000 CL- 0.0878 CD- 0.8156



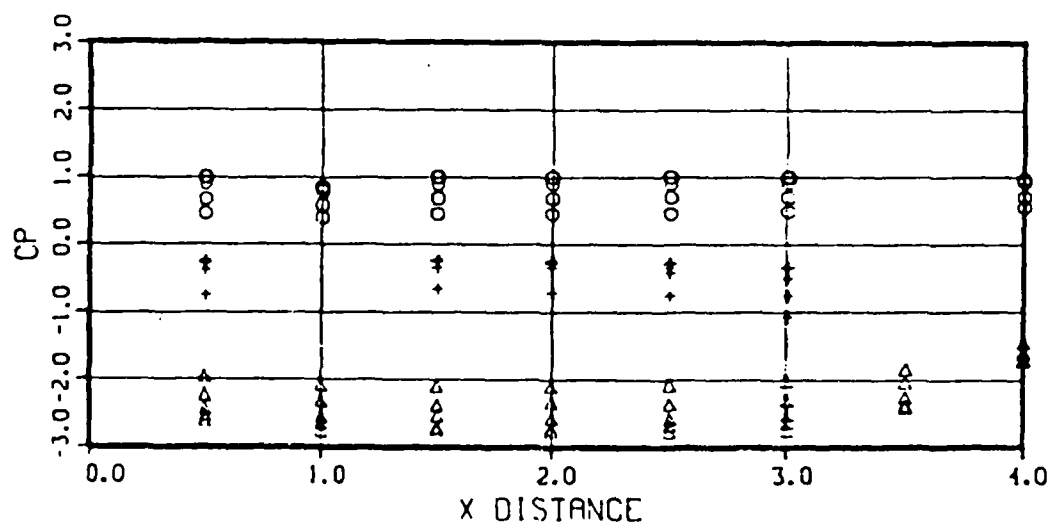
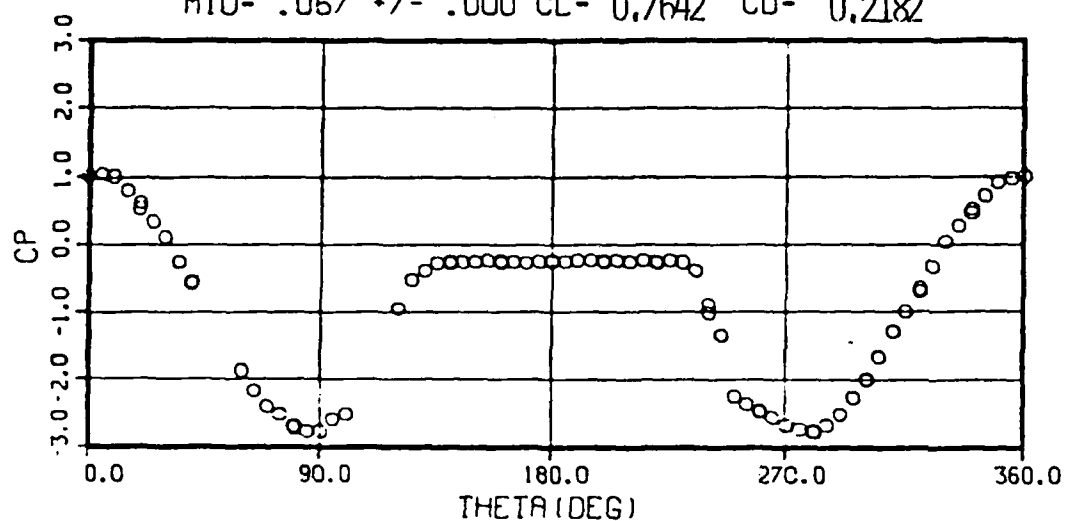
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 053 OIU- 6.5 +/- .00 RNDIU- .459 +/- .000

PIU- 2094. +/- .00 VIU- 75.29 +/- .008

MIU- .067 +/- .000 CL- 0.7642 CD- 0.2182



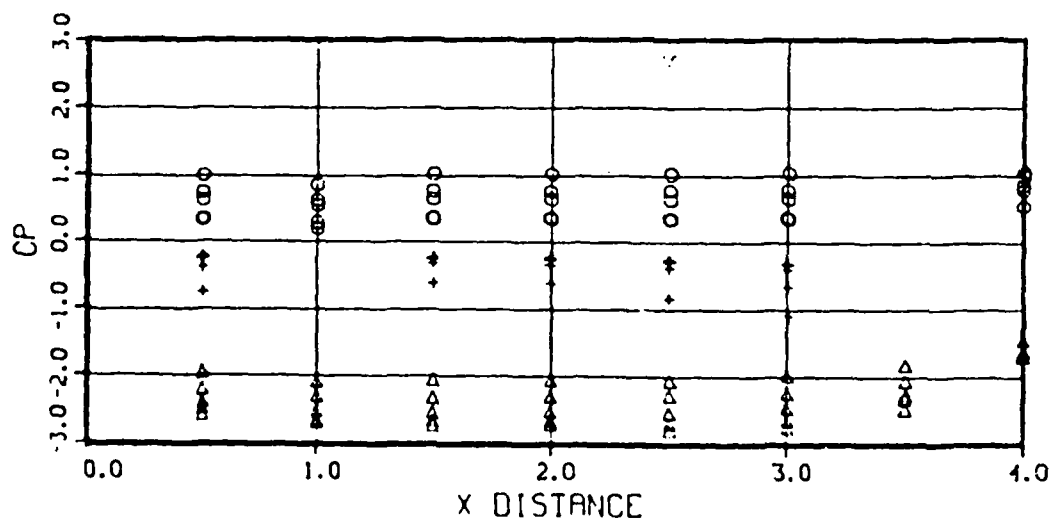
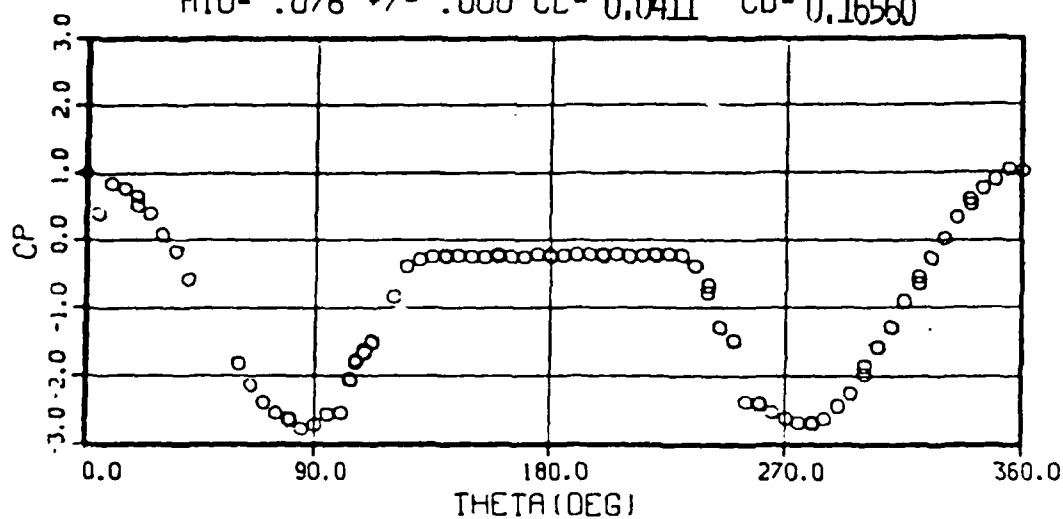
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 052 01U- 8.4 +/- .00 RND1U- .533 +/- .000

PIU- 2092. +/- .00 VIU- 85.66 +/- .000

MIU- .076 +/- .000 CL- 0.0411 CD- 0.16560



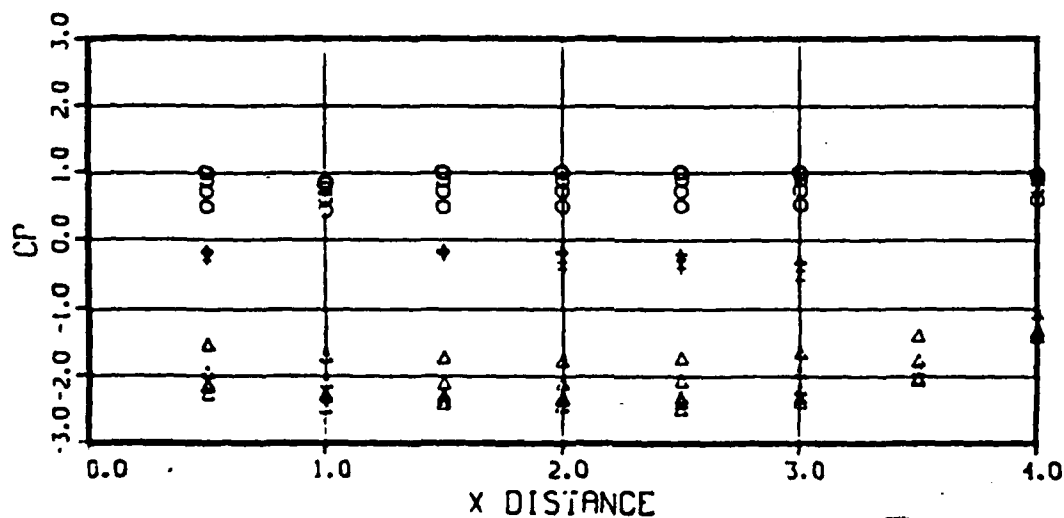
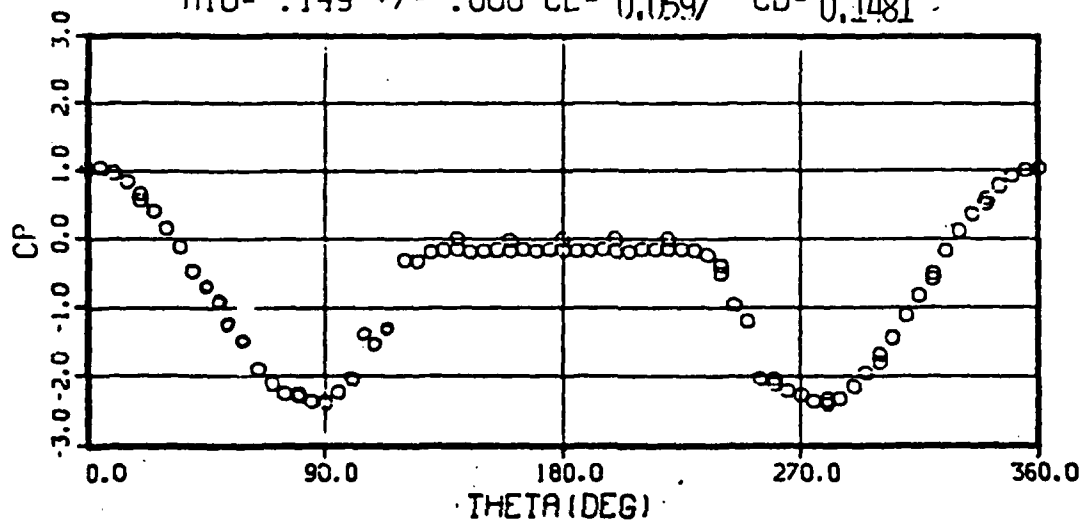
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

PUN 044 OIU- 14.3 +/- .06 RNDIU- .471 +/- .002

PIU- 928. +/- 2.20 VIU-167.35 +/- .216

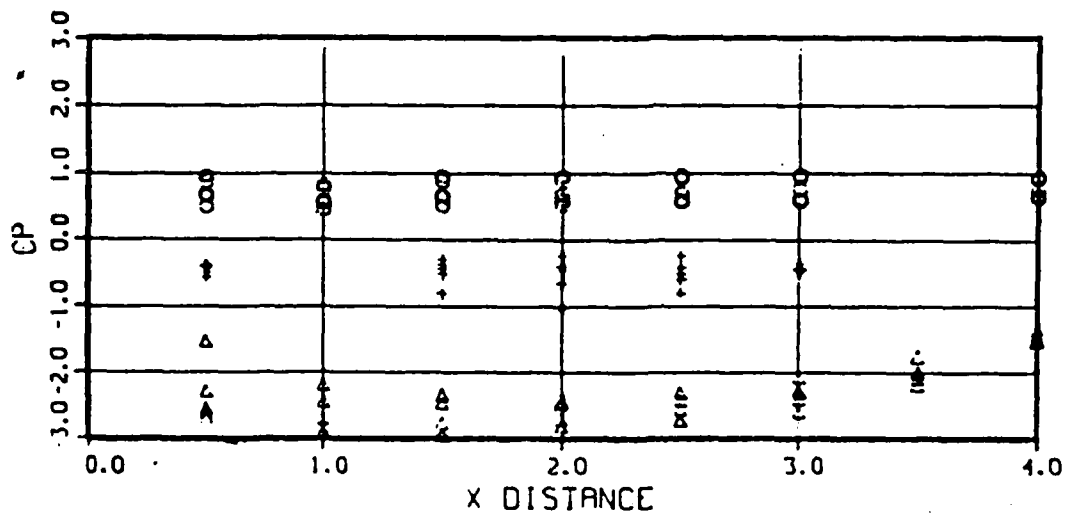
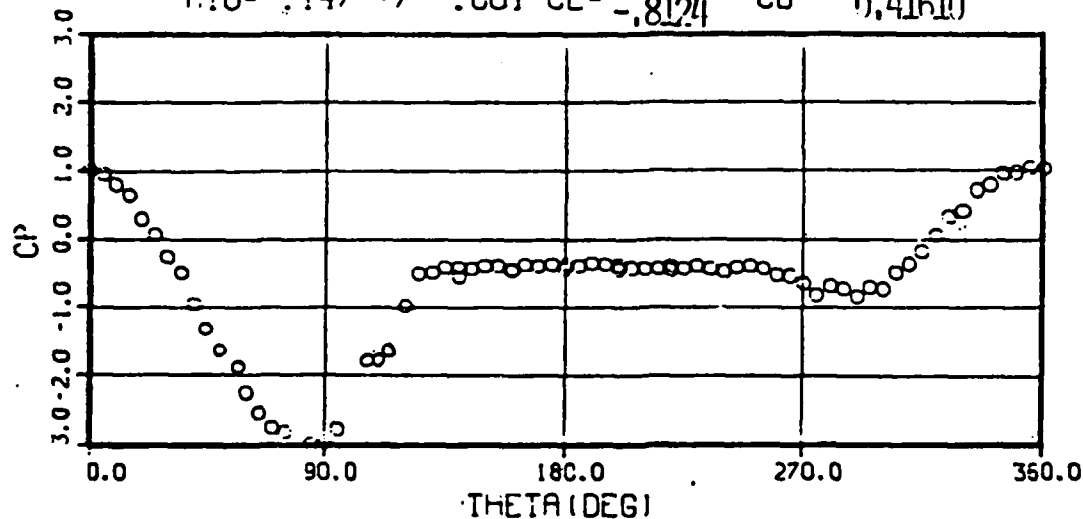
MIU- .149 +/- .000 CL- 0.0597 CD- 0.1481



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

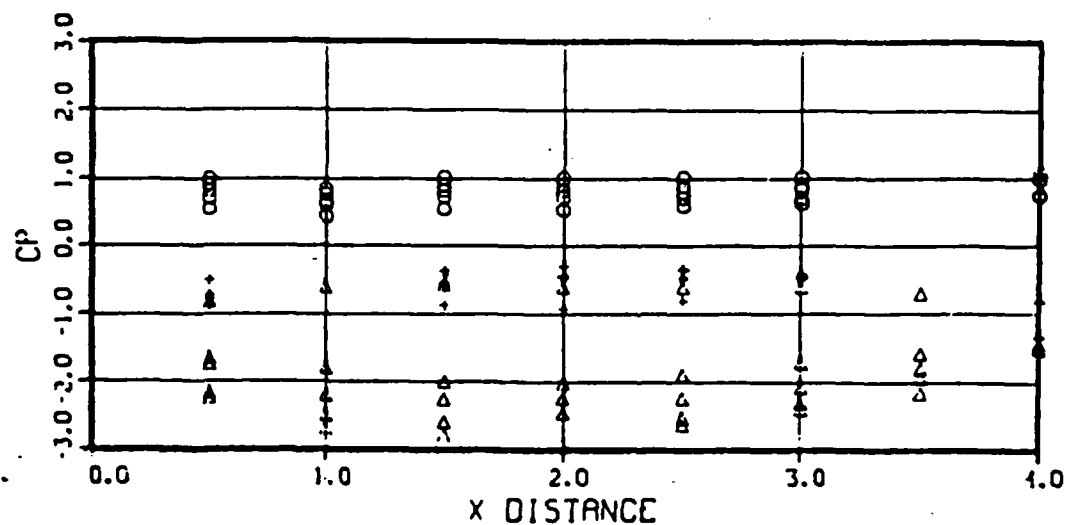
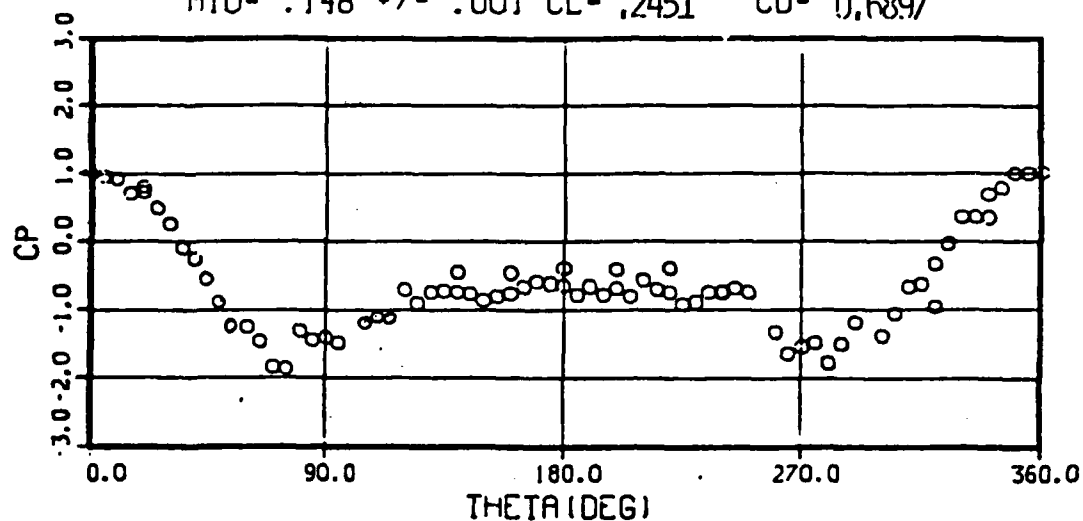
RUN 043 OIU- 12.9 +/- .18 RNDIU- .429 +/- .004
 PIU- 849. +/- 3.80 VIU-165.64 +/- .996
 MIU- .147 +/- .001 CL- .8124 CD- 0.41610



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

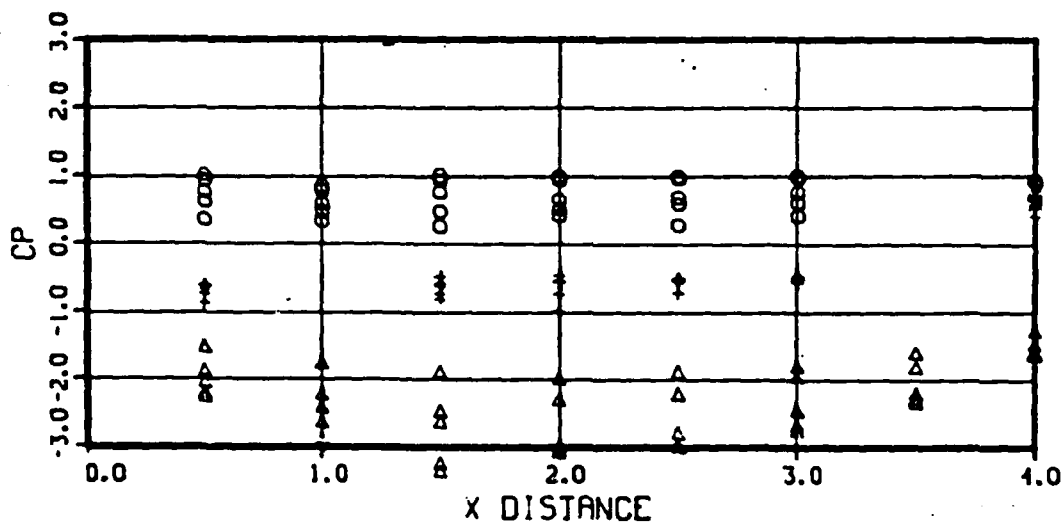
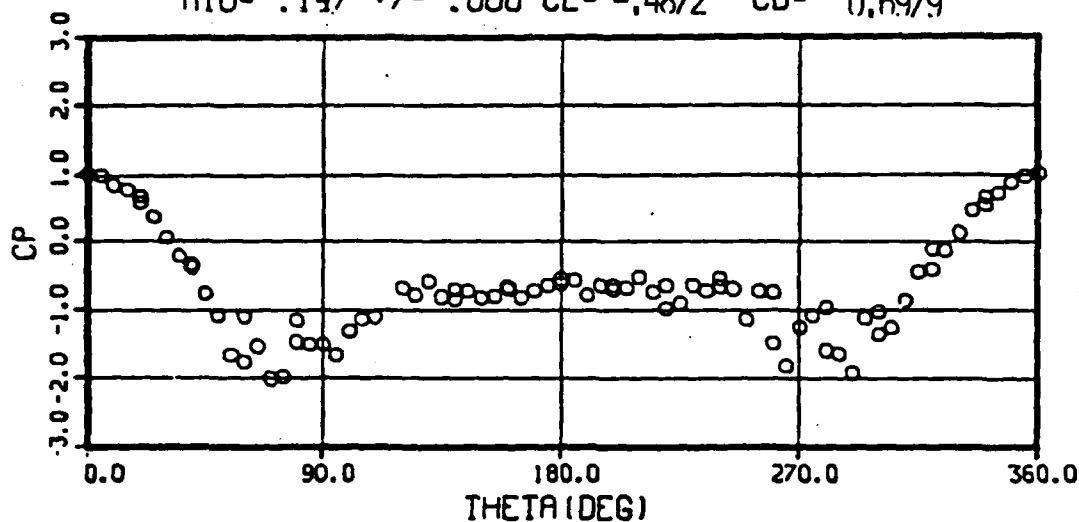
PUN 042 OIU- 12.8 +/- .26 RNDIU- .421 +/- .005
 PIU- 830. +/- 4.20 VIU-166.32 +/- 1.198
 MIU- .148 +/- .001 CL- .2451 CO- 0.6897



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

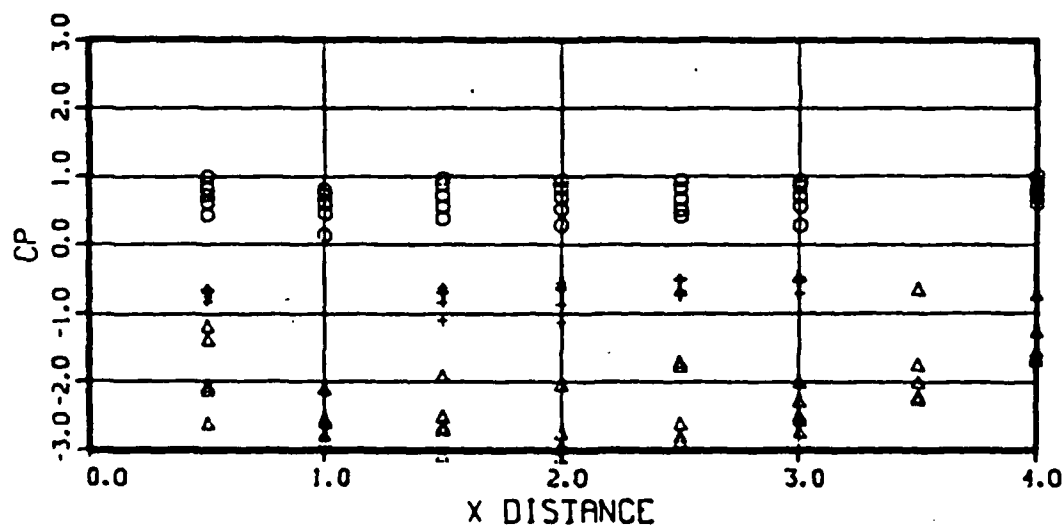
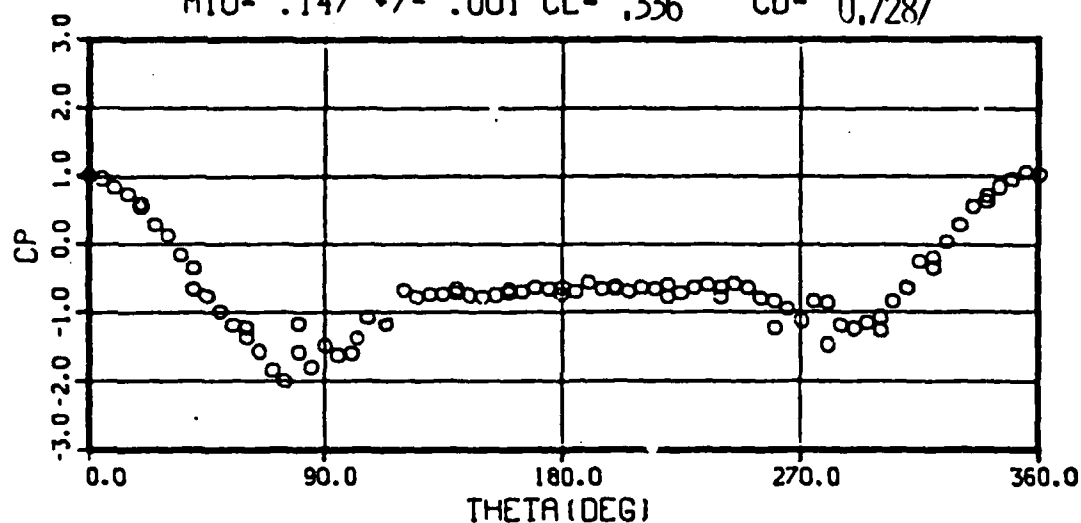
RUN 041 OIU- 12.5 +/- .06 RNDIU- .414 +/- .003
 PIU- 820. +/- 4.80 VIU-165.47 +/- .312
 MIU- .147 +/- .000 CL- -.4872 CD- 0.6979



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-O 64DEG-X. 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

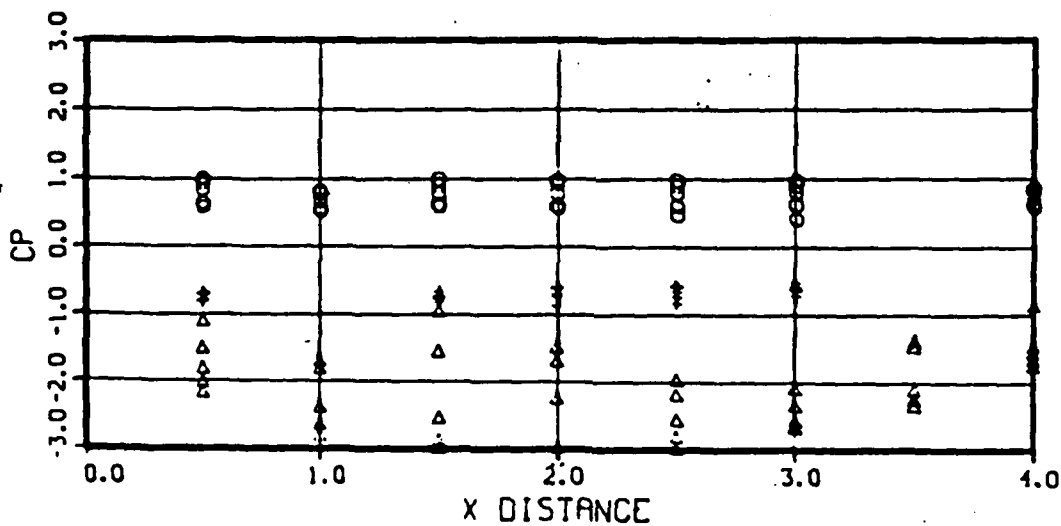
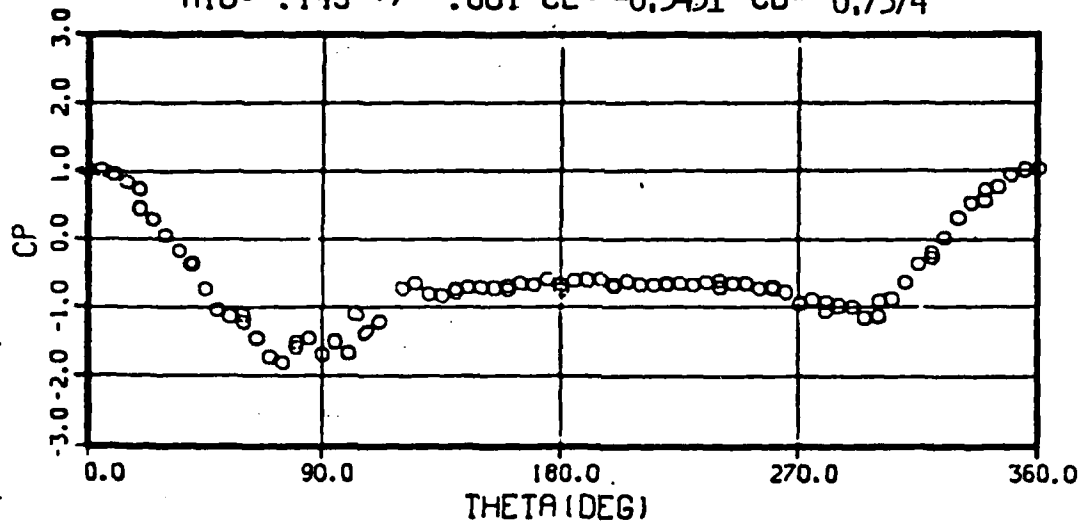
RUN 040 OIU- 12.3 +/- .18 RNDIU- .408 +/- .003
 PIU- 811. +/- 3.80 VIU-165.30 +/- .980
 MIU- .147 +/- .001 CL- .336 CD- 0.7287



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 039 OIU- 12.1 +/- .00 RNDIU- .400 +/- .002
 PIU- 792. +/- 3.80 VIU-165.95 +/- .314
 MIU- .149 +/- .001 CL- -0.3431 CD- 0.7574



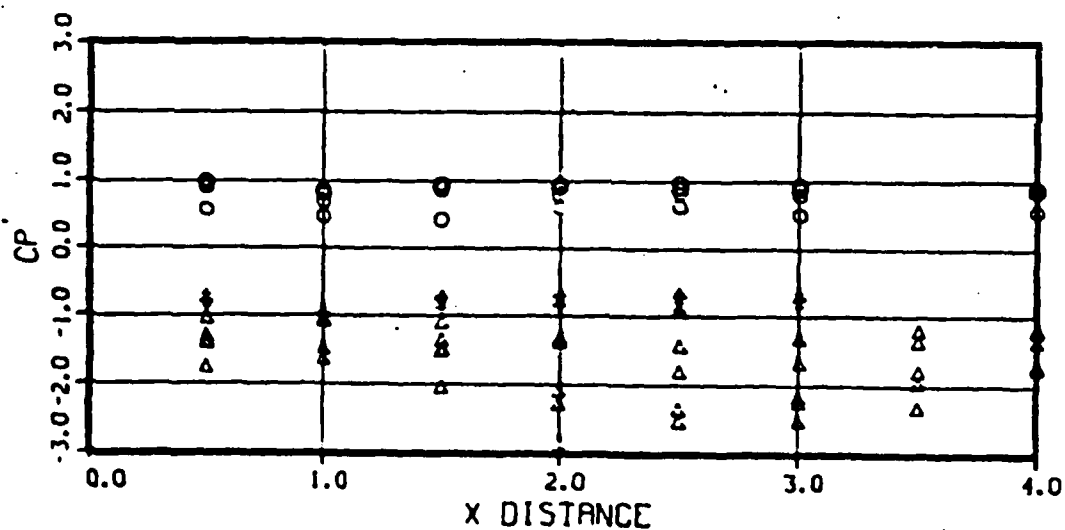
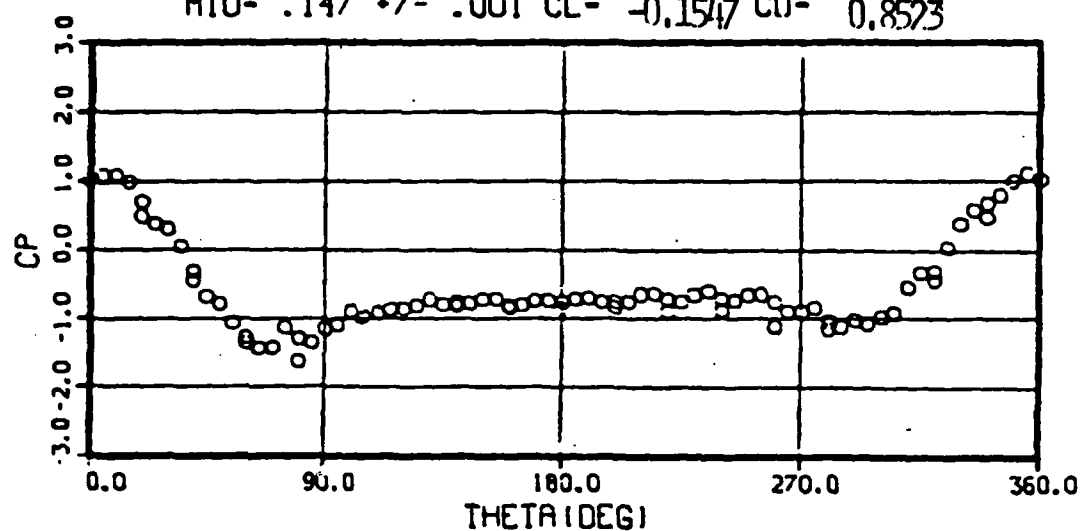
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 038 OIU- 11.6 +/- .10 RNDIU- .386 +/- .003

PIU- 769. +/- 4.60 VIU-164.93 +/- .574

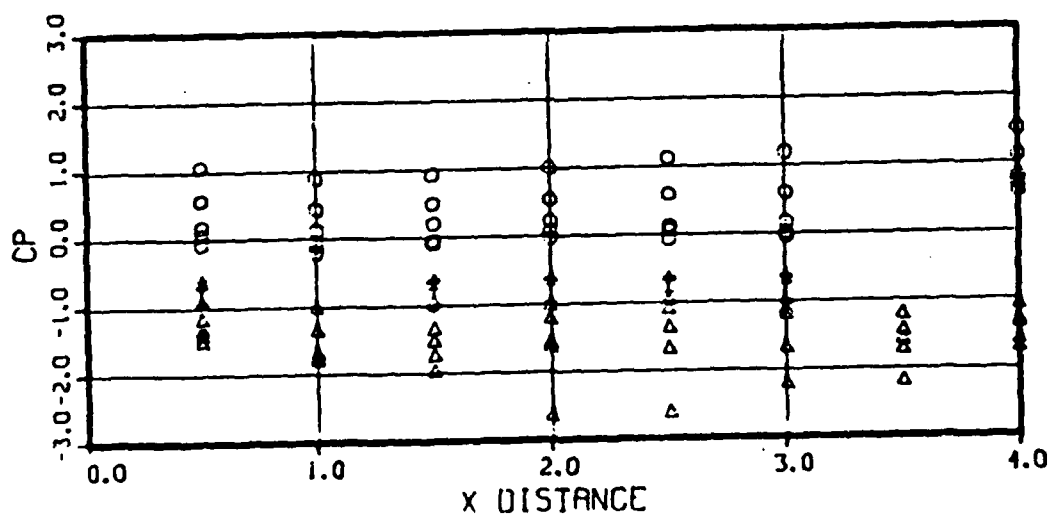
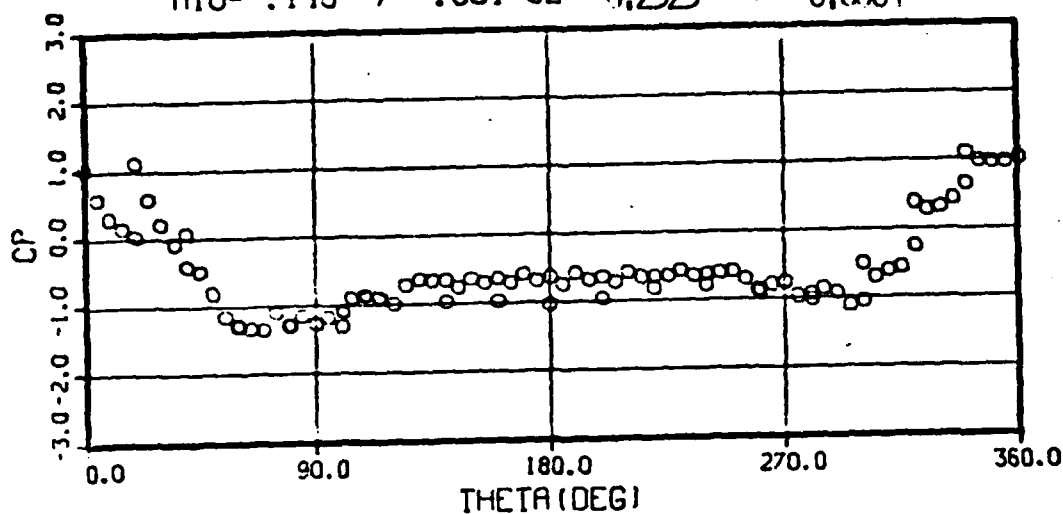
MIU- .147 +/- .001 CL- -0.1547 CD- 0.8523



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-- 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

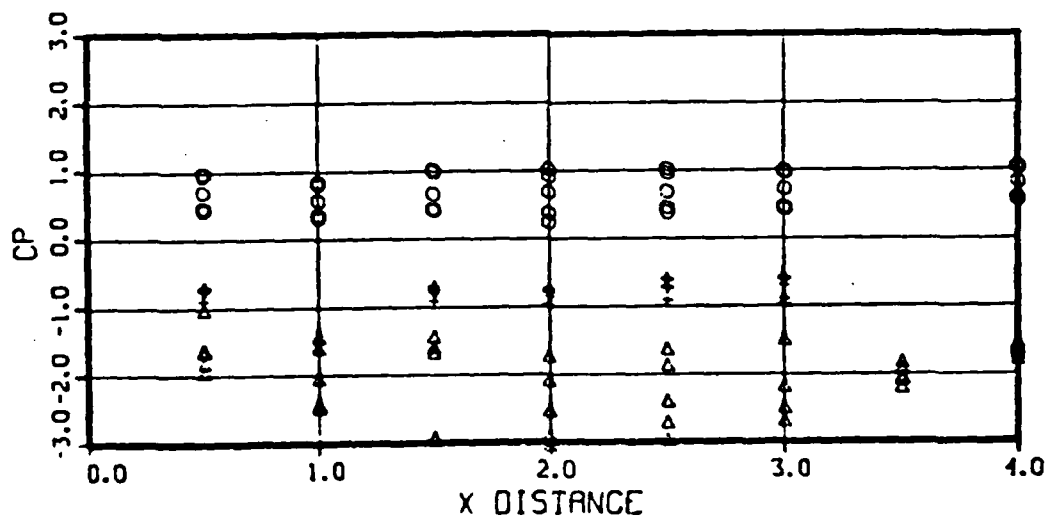
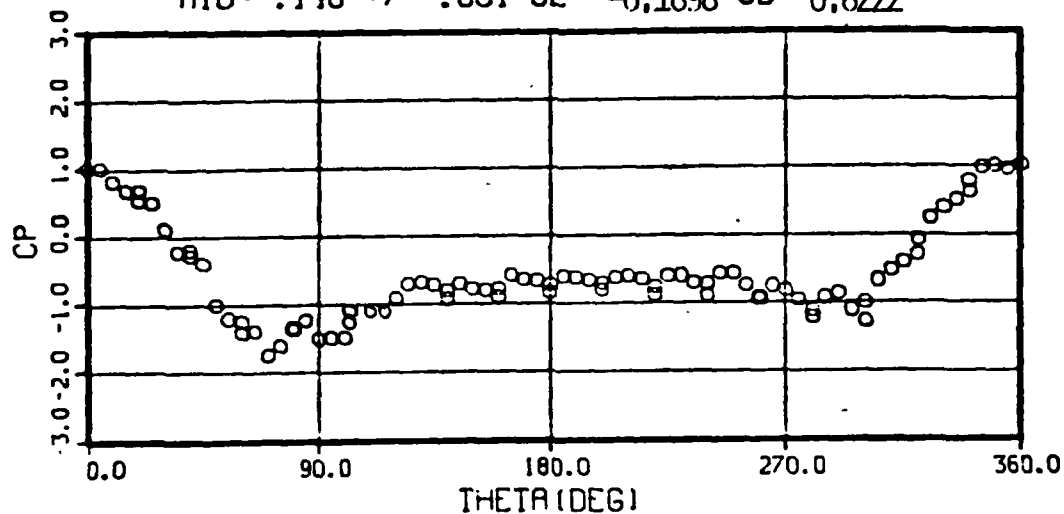
RUN 049 OIU- 11.4 +/- .12 RNDIU- .384 +/- .003
 PIU- 767. +/- 8.20 VIU-163.47 +/- 1.246
 MIU- .146 +/- .001 CL- -0.2523 CD- 0.8064



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 048 OIU- 11.8 +/- .08 RNDIU- .395 +/- .002
 PIU- 785. +/- 2.40 VIU-164.22 +/- .388
 MIU- .146 +/- .001 CL- -0.1898 CD- 0.8222



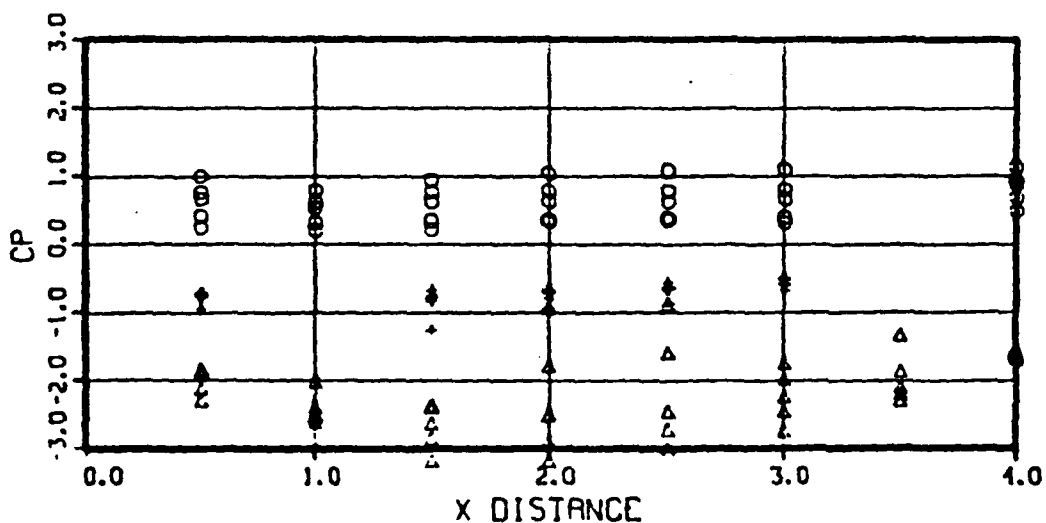
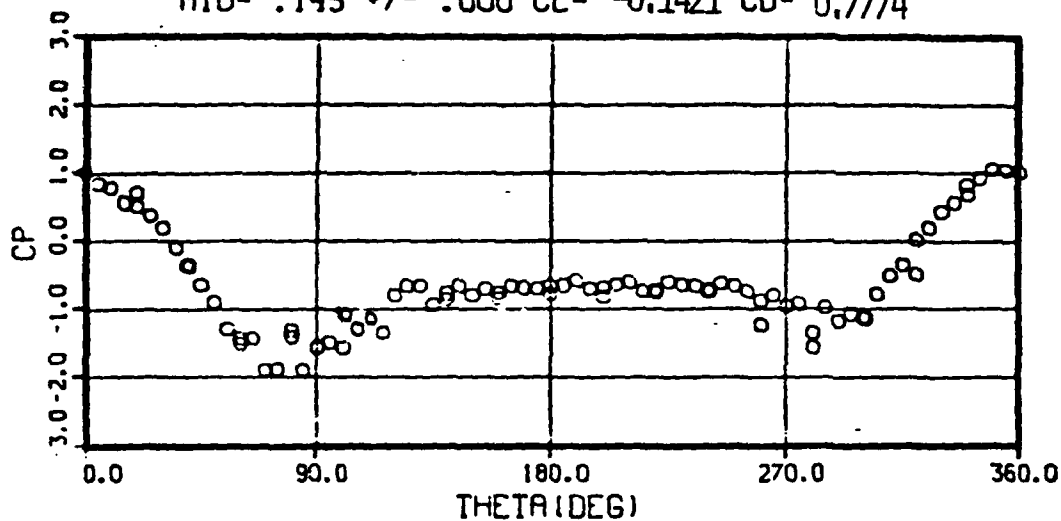
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 047 OIU- 11.9 +/- .08 RNDIU- .403 +/- .002

PIU- 807. +/- 2.20 VIU-162.86 +/- .172

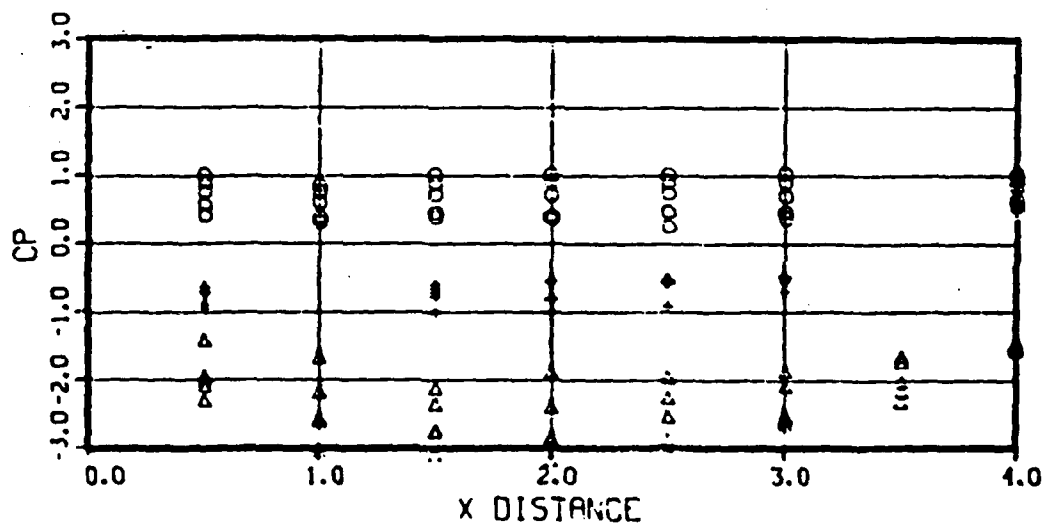
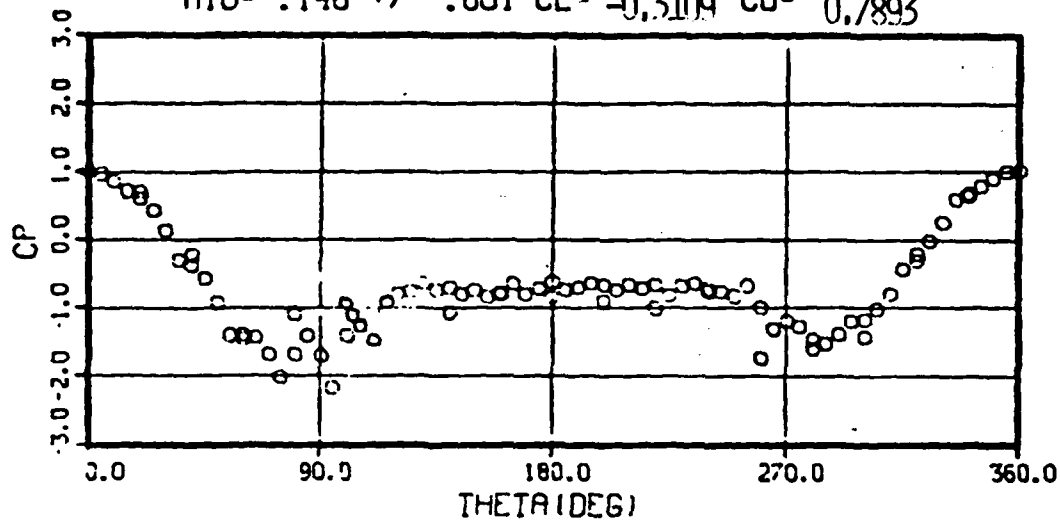
MIU- .145 +/- .000 CL- -0.1421 CD- 0.7774



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 046 OIU- 12.3 +/- .10 RNDIU- .415 +/- .002
 PIU- 828. +/- 3.40 VIU- 163.43 +/- .352
 MIU- .146 +/- .001 CL- -0.3109 CD- 0.7893



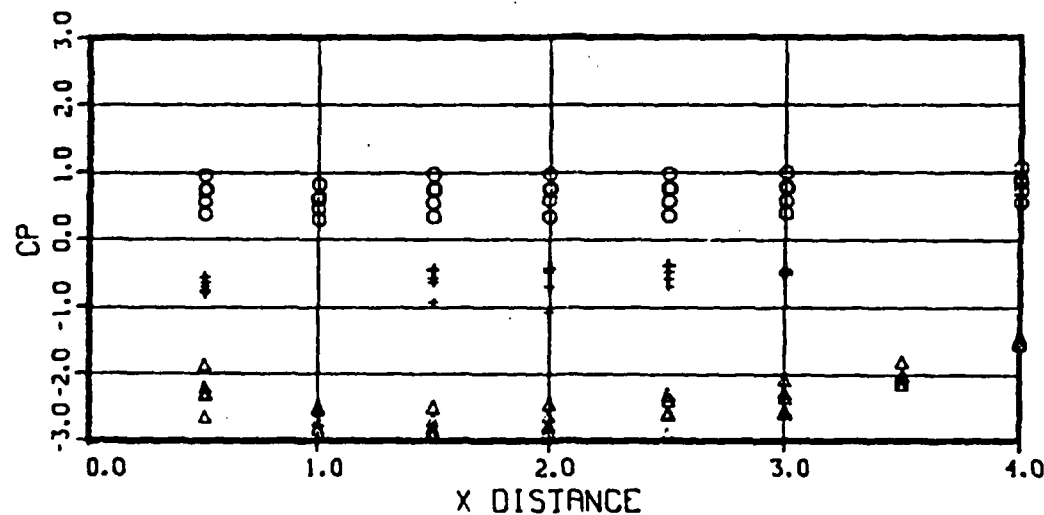
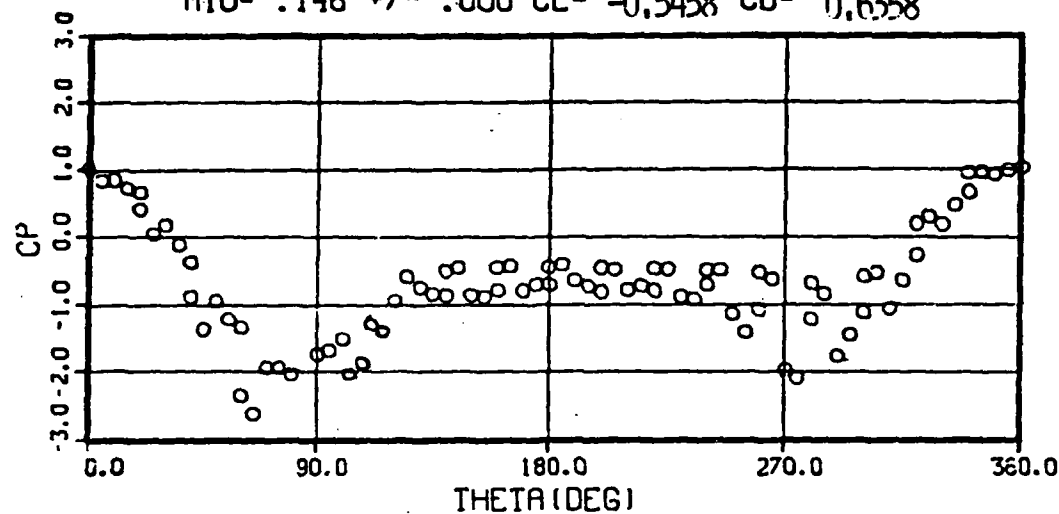
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 045 OIU- 12.5 +/- .00 RNDIU- .422 +/- .000

PIU- 842. +/- 2.60 VIU-163.54 +/- .198

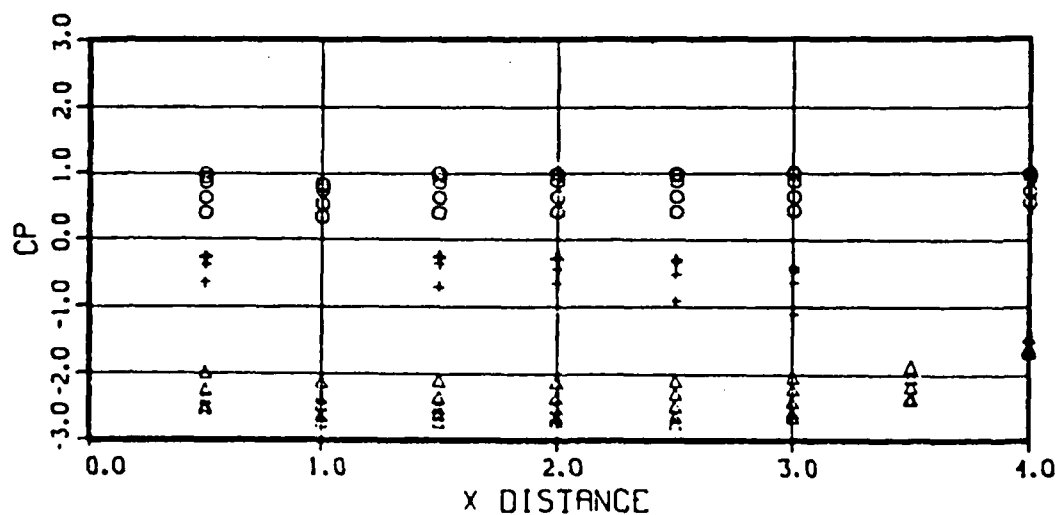
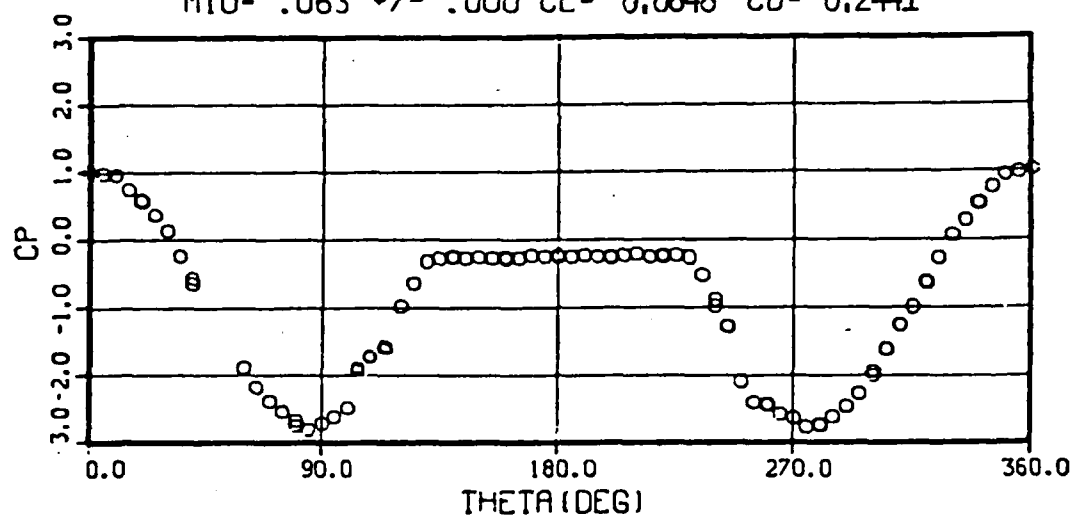
MIU- .146 +/- .000 CL- -0.5458 CD- 0.6358



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

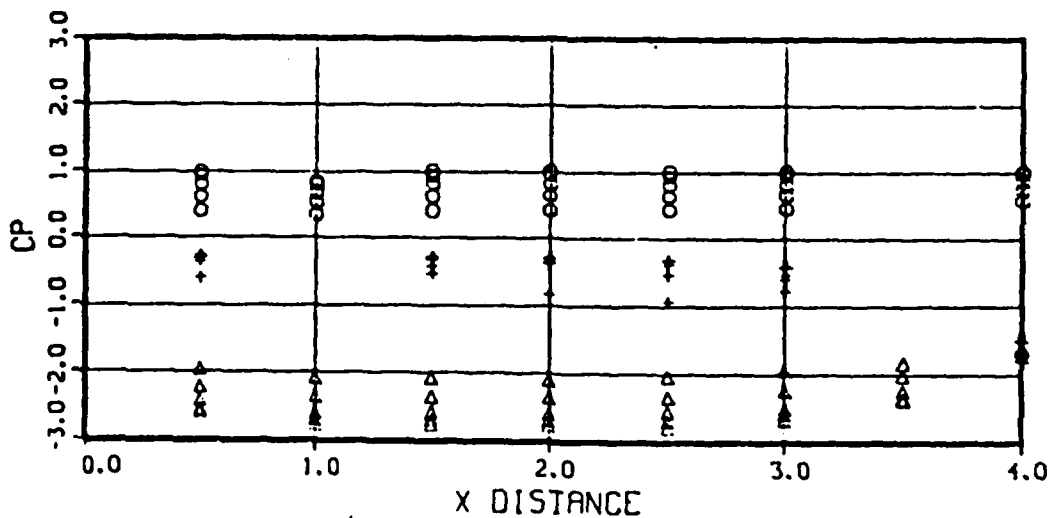
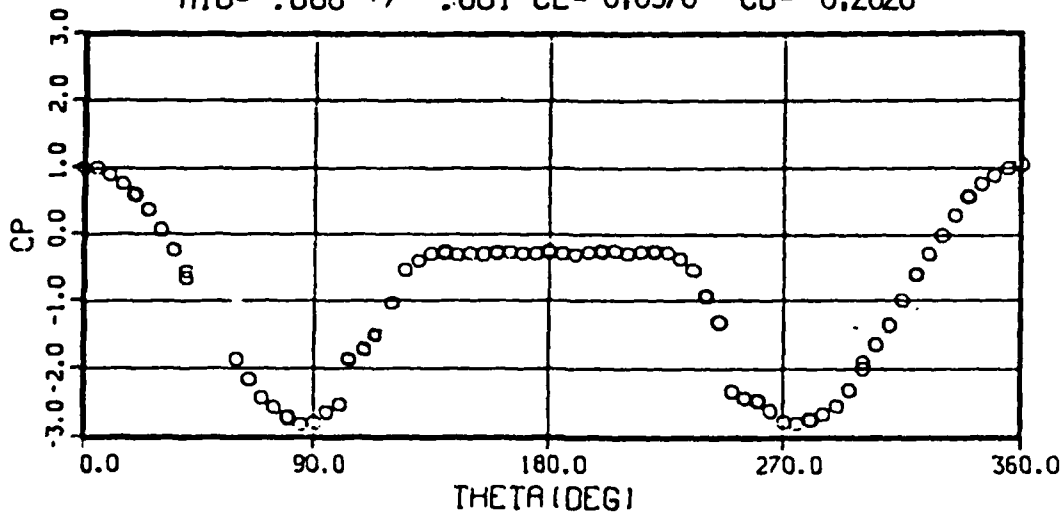
RUN 054 OIU- 5.8 +/- .00 RNDIU- .444 +/- .000
 PIU- 2094. +/- .00 VIU- 71.18 +/- .006
 MIU- .063 +/- .000 CL- 0.0848 CD- 0.2441



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

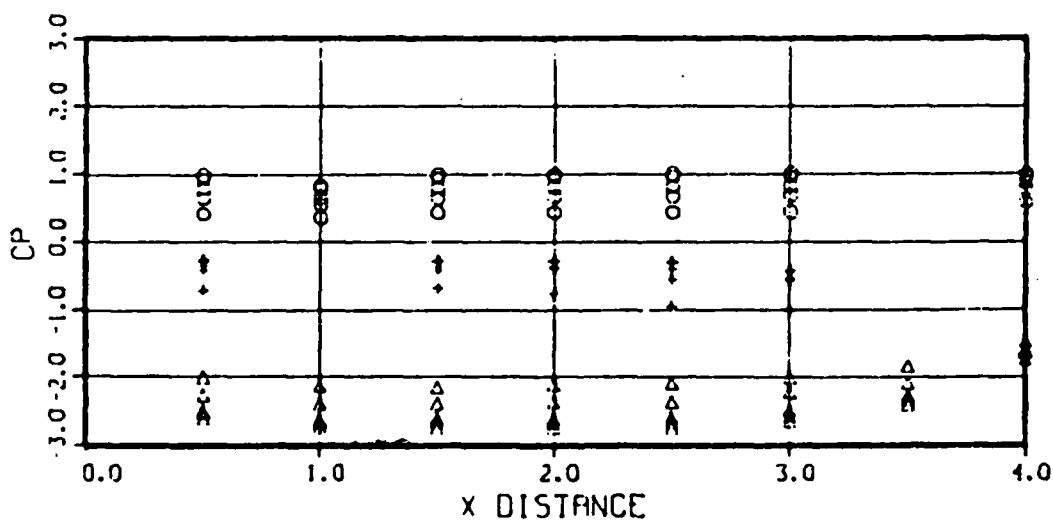
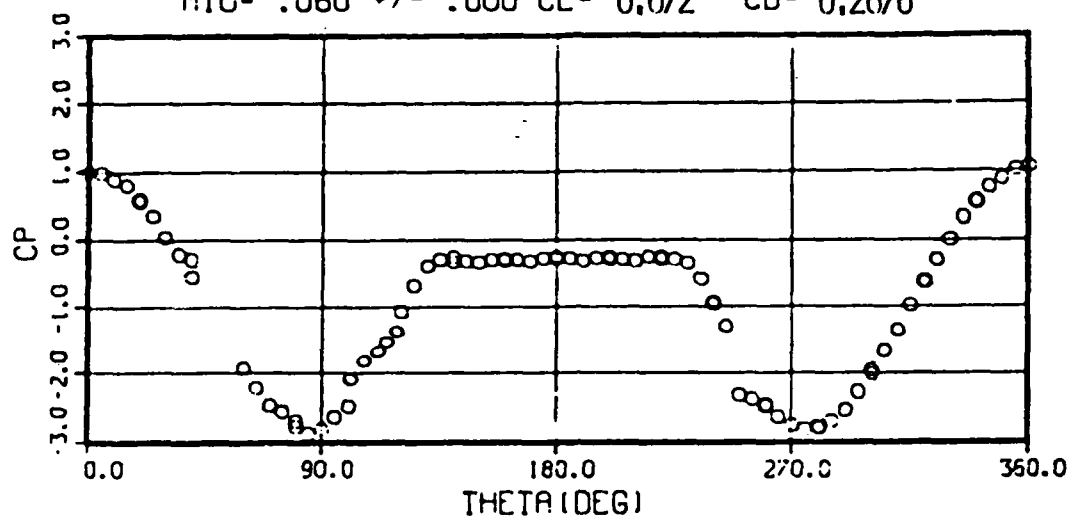
RUN 055 OIU- 5.3 +/- .08 RNDIU- .427 +/- .002
 PIU- 2095. +/- .00 VIU- 68.41 +/- .392
 MIU- .060 +/- .001 CL- 0.0976 CD- 0.2626



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

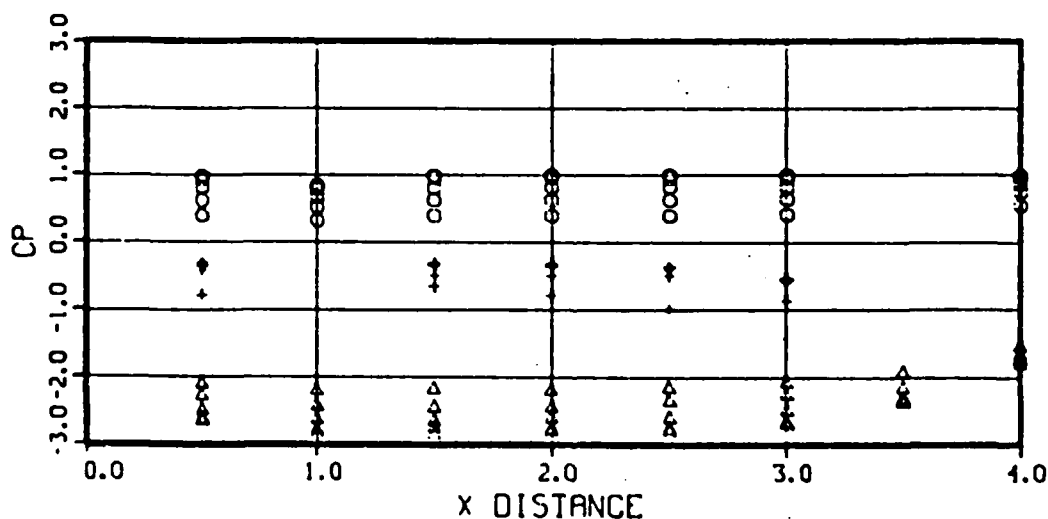
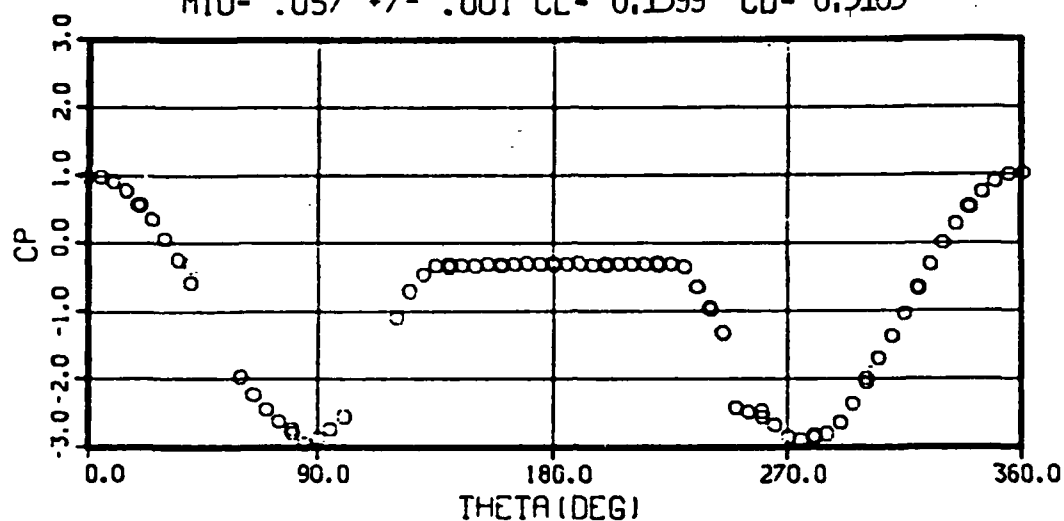
RUN 056 OIU- 5.3 +/- .00 RNDIU- .423 +/- .000
 PIU- 2095. +/- .00 VIU- 67.81 +/- .006
 MIU- .060 +/- .000 CL- 0.072 CD- 0.2676



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

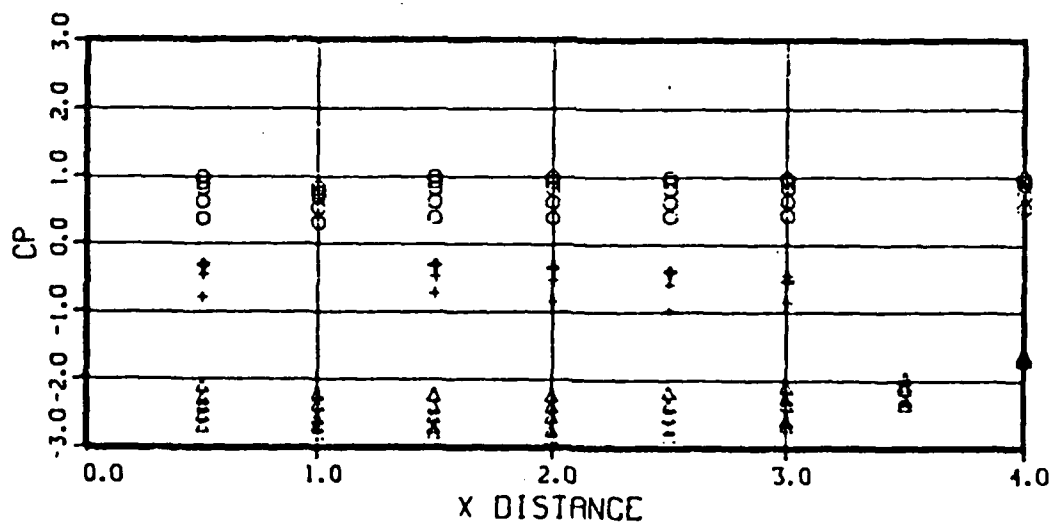
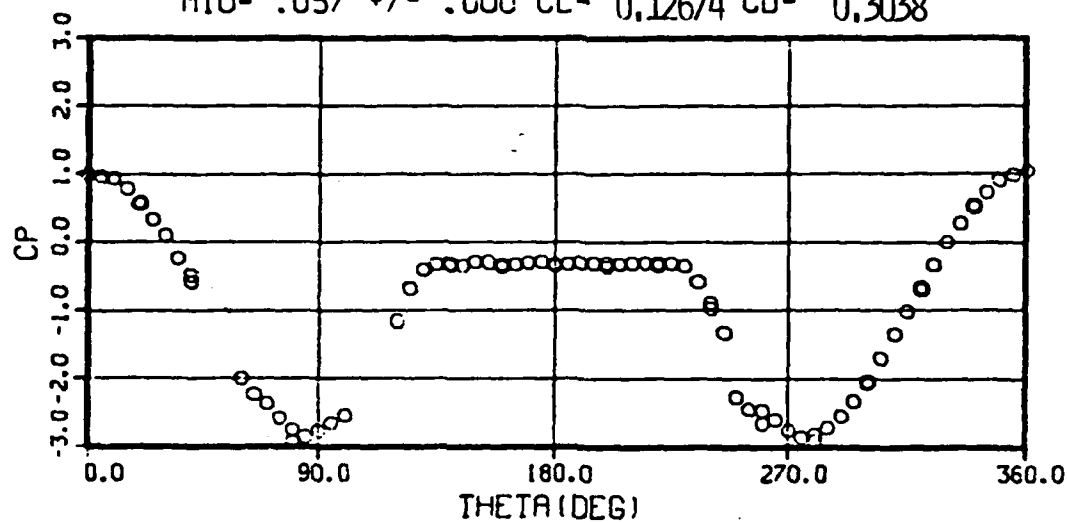
RUN 057 OIU- 4.8 +/- .08 RNDIU- .406 +/- .002
 PIU- 2095. +/- .00 VIU- 64.88 +/- .410
 MIU- .057 +/- .001 CL- 0.1599 CD- 0.3105



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

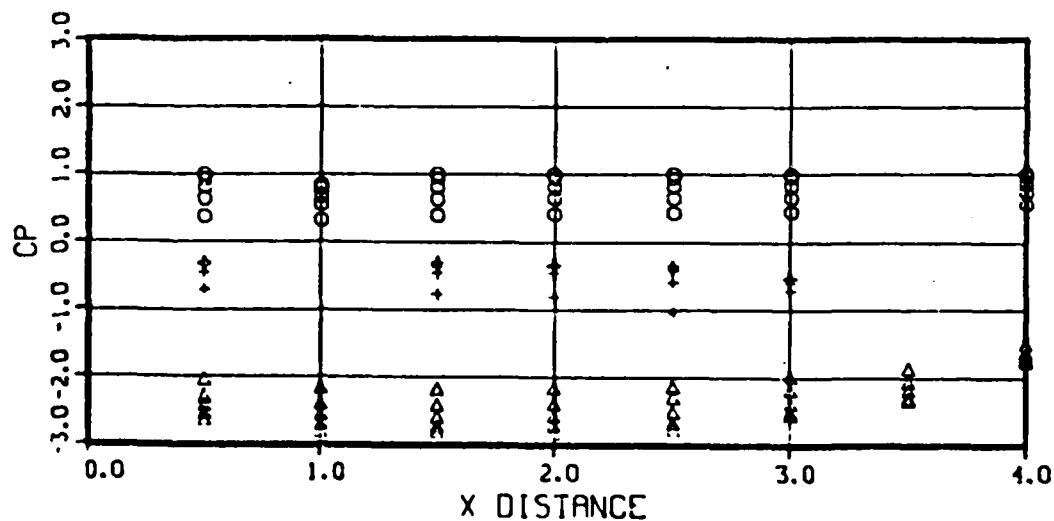
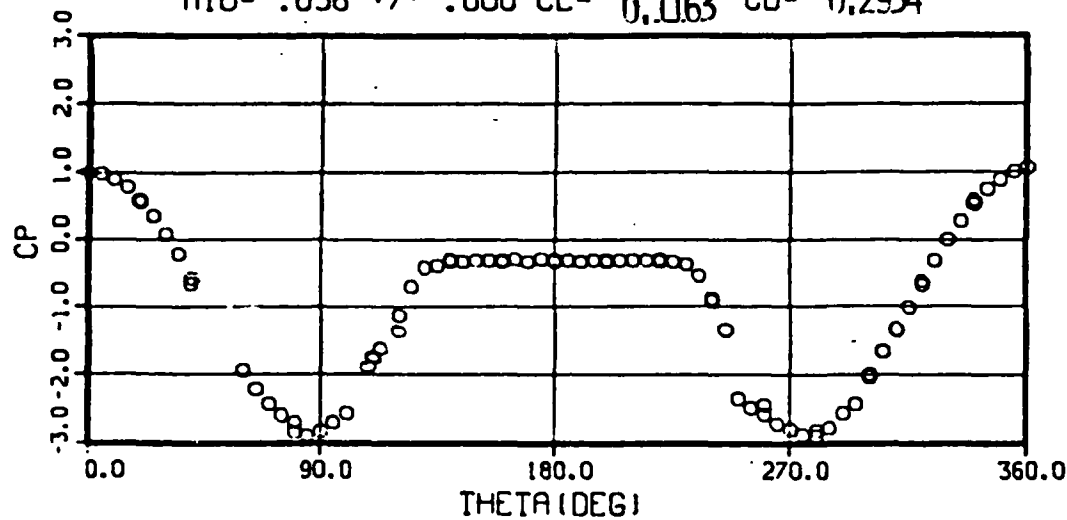
RUN 058 OIU- 4.8 +/- .06 RNDIU- .404 +/- .002
 PIU- 2095. +/- .00 VIU- 64.56 +/- .320
 MIU- .057 +/- .000 CL- 0.12674 CD- 0.3038



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

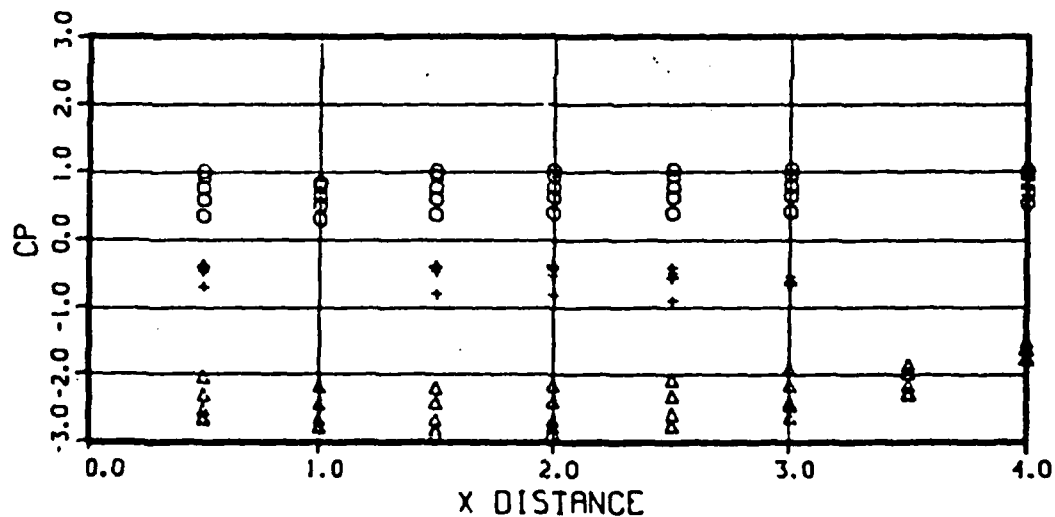
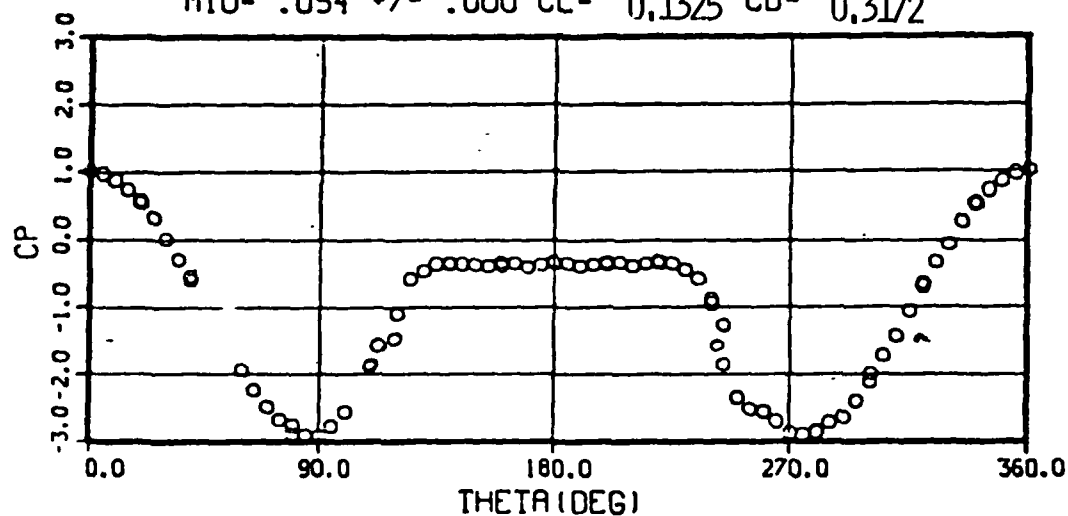
RUN 059 OIU- 4.6 +/- .00 RNDIU- .395 +/- .000
 PIU- 2096. +/- .00 VIU- 63.19 +/- .006
 MIU- .056 +/- .000 CL- 0.1163 CD- 0.2954



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

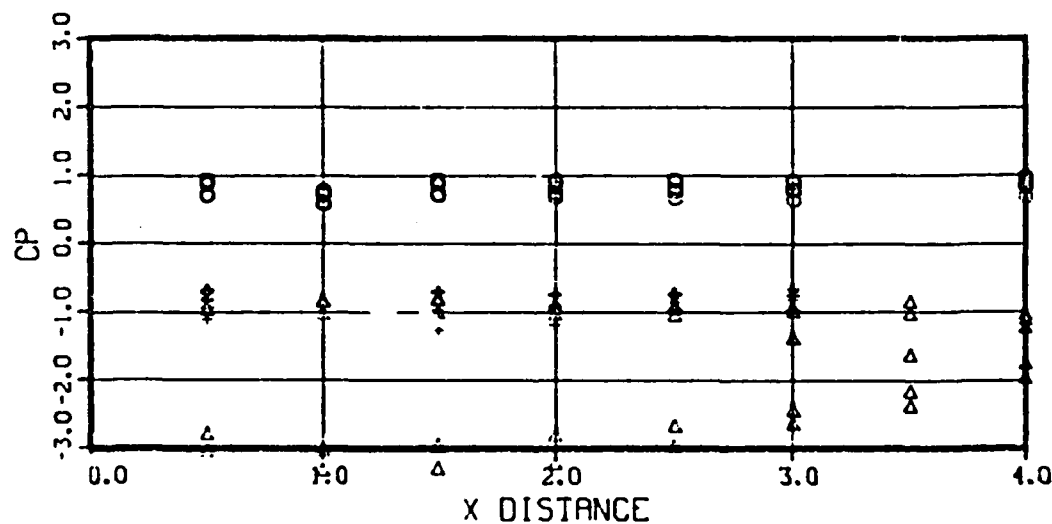
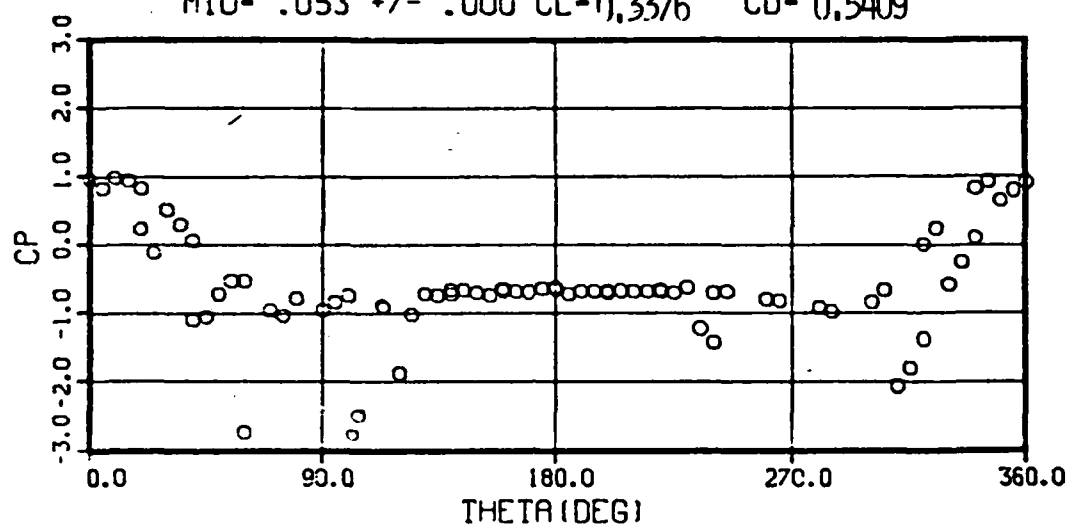
RUN 060 QIU- 4.3 +/- .00 RNDIU- .382 +/- .000
 PIU- 2096. +/- .00 VIU- 61.04 +/- .000
 MIU- .054 +/- .000 CL- 0.1325 CD- 0.3172



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40 DEG-0 64 DEG-- 124 DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

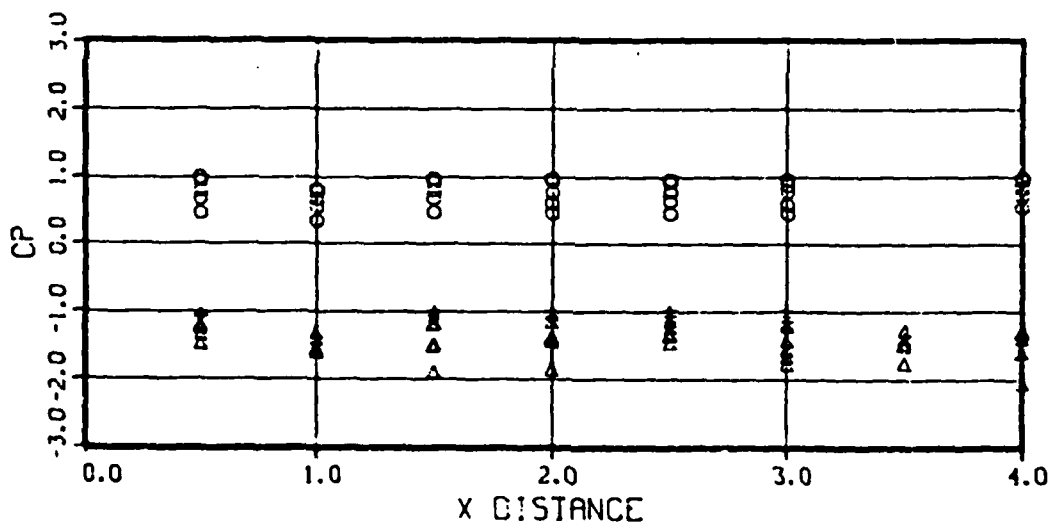
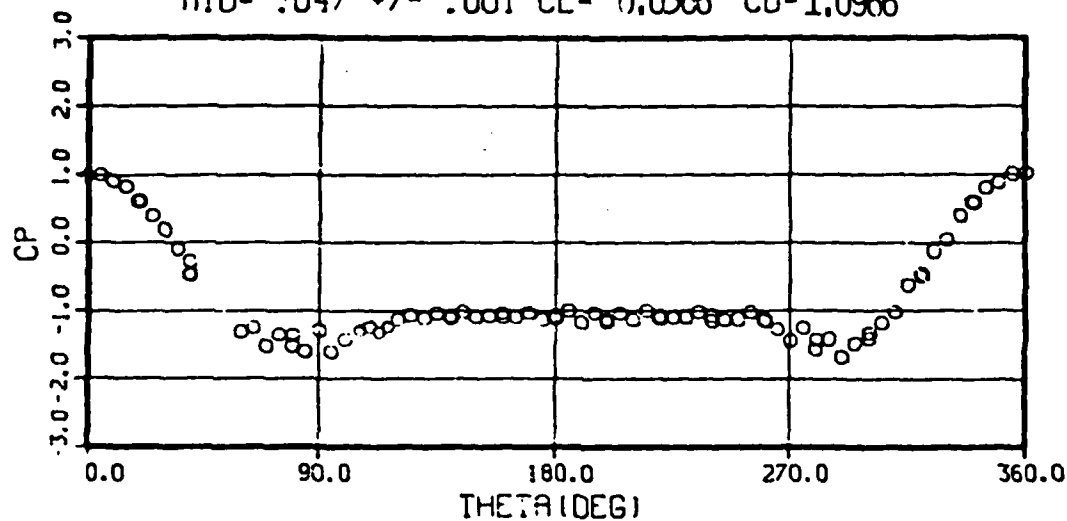
RUN 061 OIU- 4.1 +/- .00 RNDIU- .372 +/- .000
 PIU- 2096. +/- .00 VIU- 59.38 +/- .008
 MIU- .053 +/- .000 CL-0.3376 CD- 0.5409



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

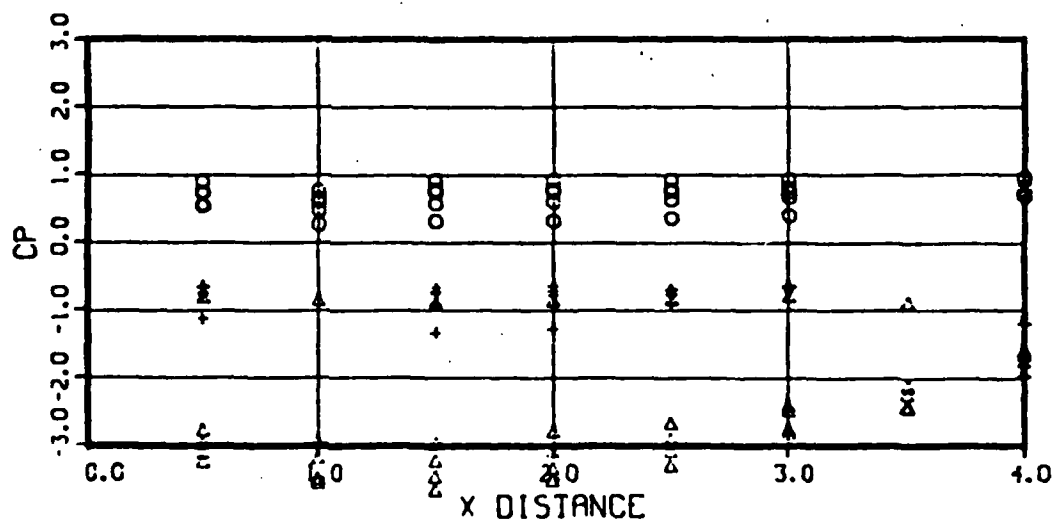
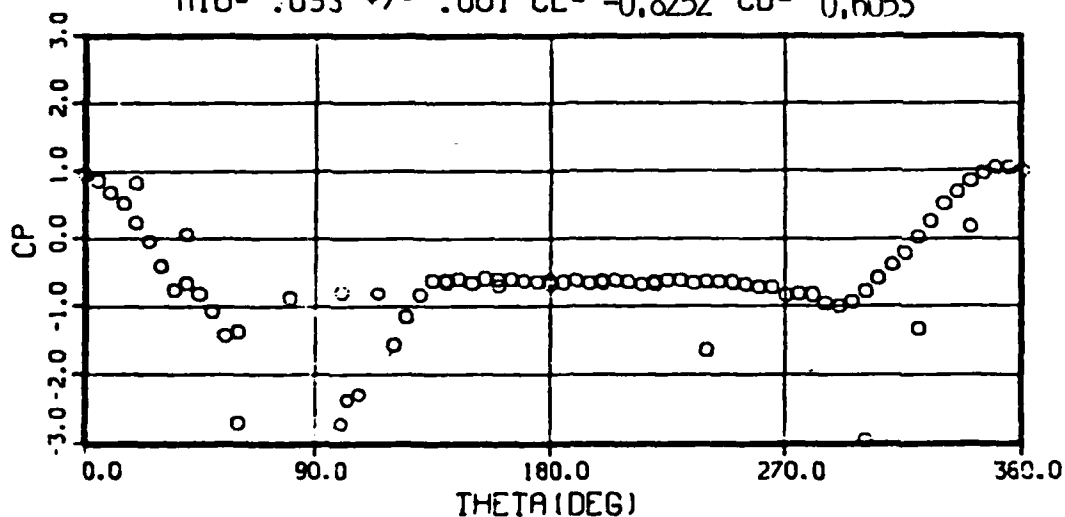
RUN 062 OIU- 3.2 +/- .08 RNDIU- .330 +/- .003
 PIU- 2096. +/- .00 VIU- 52.73 +/- .498
 MIU- .047 +/- .001 CL- 0.0366 CD-1.0966



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-- 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

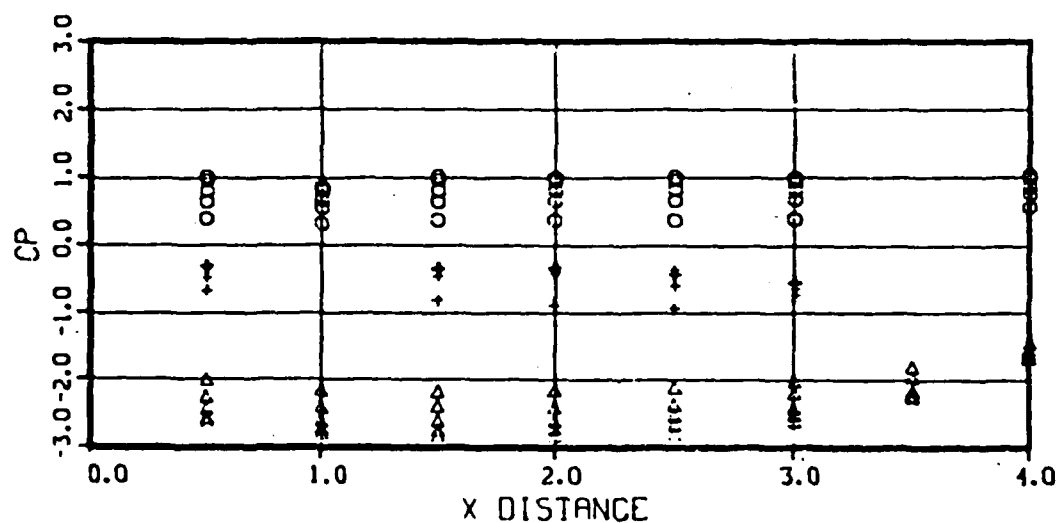
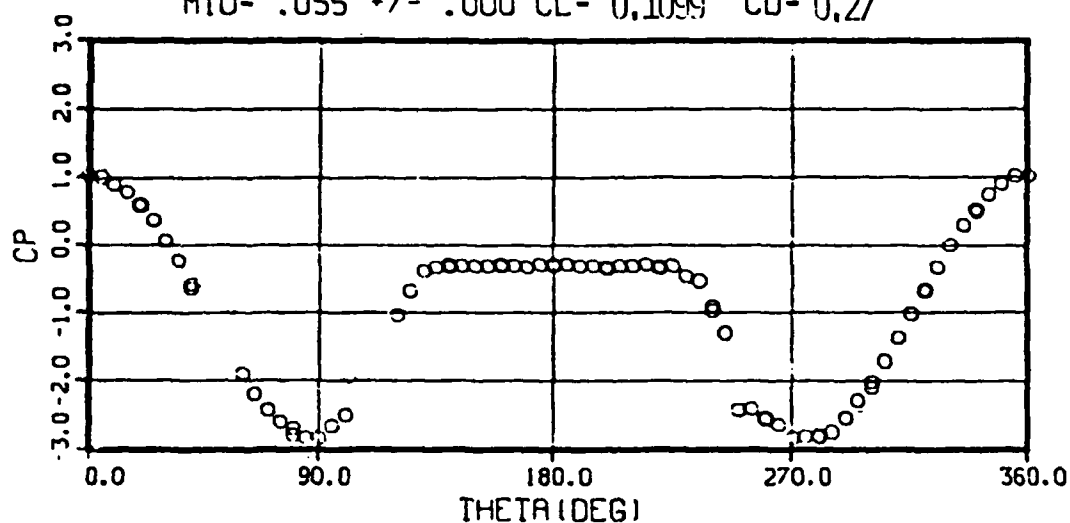
RUN 063 OIU- 4.1 +/- .08 RNDIU- .371 +/- .002
 PIU- 2095. +/- .00 VIU- 59.25 +/- .450
 MIU- .053 +/- .001 CL- -0.8252 CD- 0.6053



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

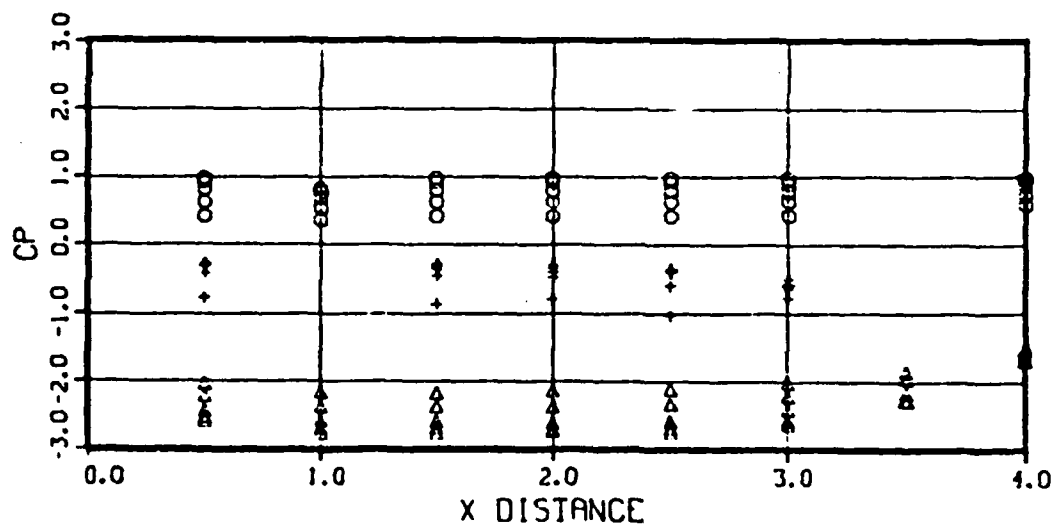
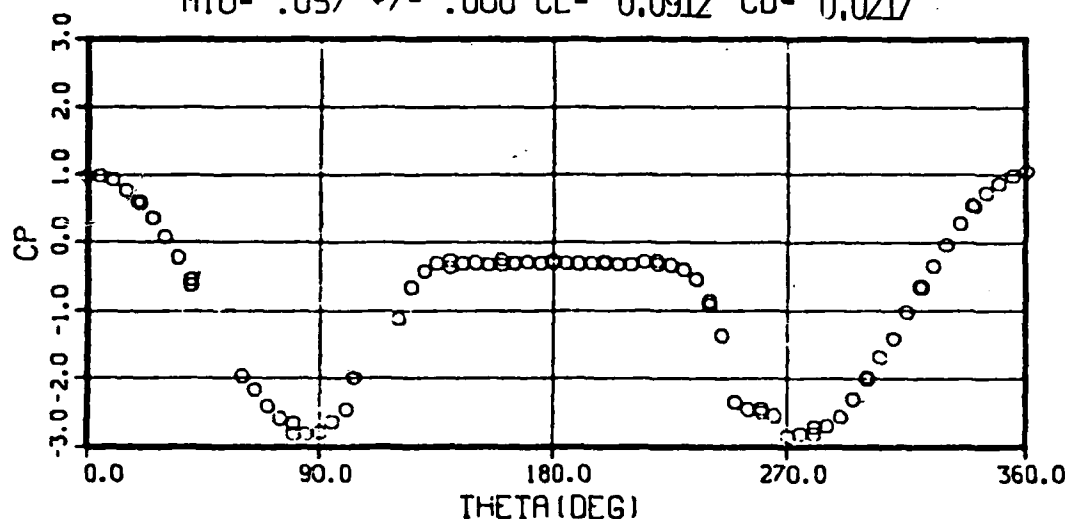
RUN 065 OIU- 4.5 +/- .00 RNDIU- .393 +/- .000
 PIU- 2095. +/- .00 VIU- 62.61 +/- .008
 MIU- .055 +/- .000 CL- 0.1099 CD- 0.27



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

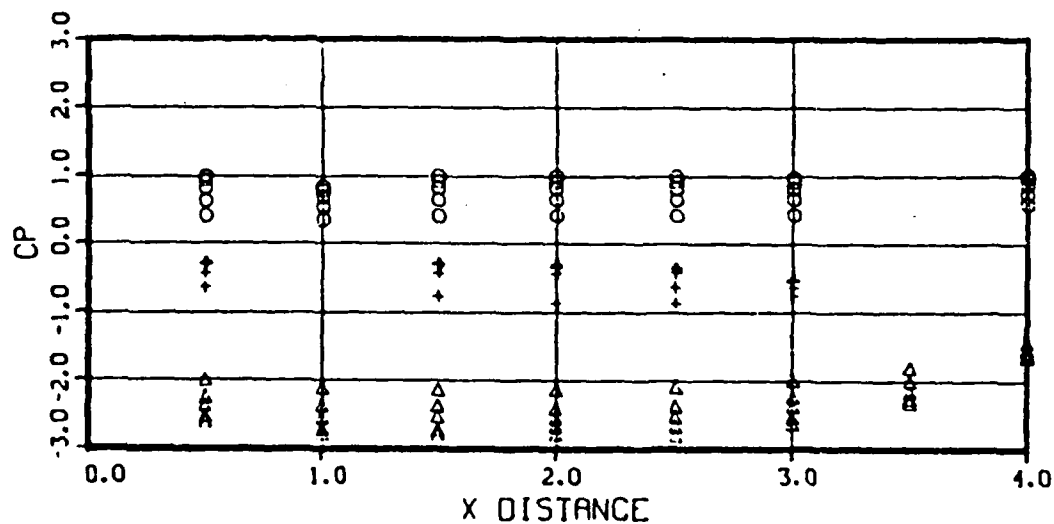
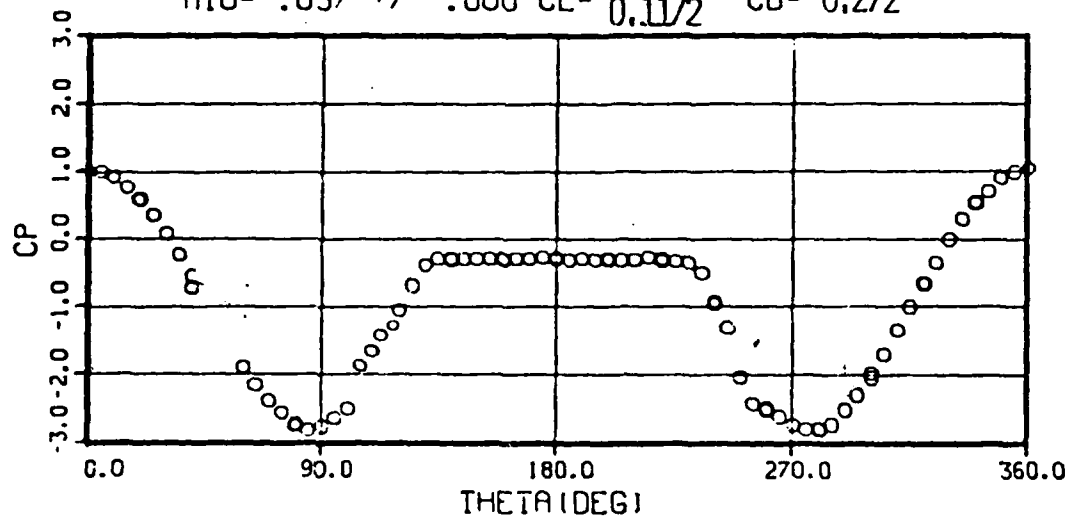
RUN 066 OIU- 4.7 +/- .00 RNDIU- .403 +/- .000
 PIU- 2095. +/- .00 VIU- 64.17 +/- .008
 MIU- .057 +/- .000 CL- 0.0912 CD- 0.0217



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 067 OIU- 4.8 +/- .00 RNDIU- .406 +/- .000
 PIU- 2095. +/- .00 VIU- 64.68 +/- .010
 MIU- .057 +/- .000 CL- 0.1172 CD- 0.272



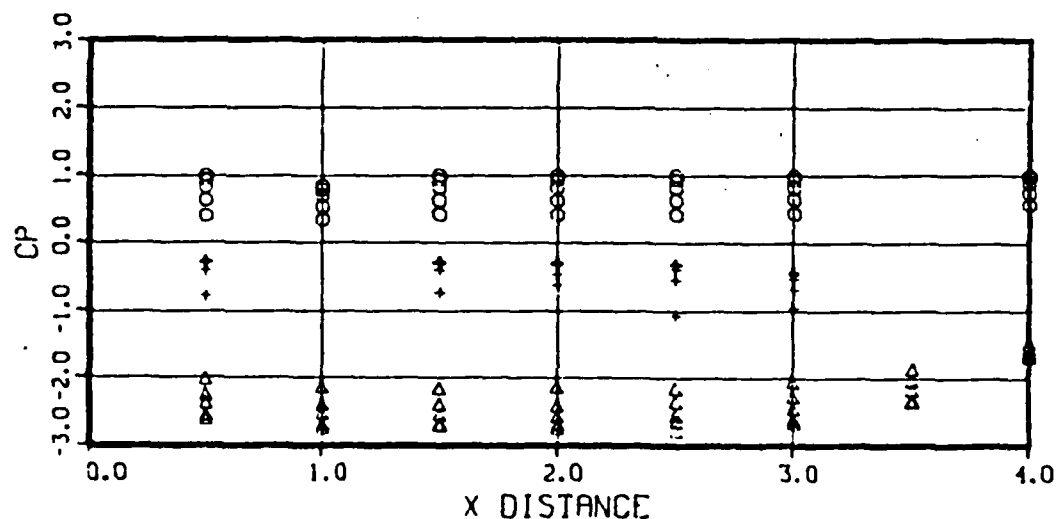
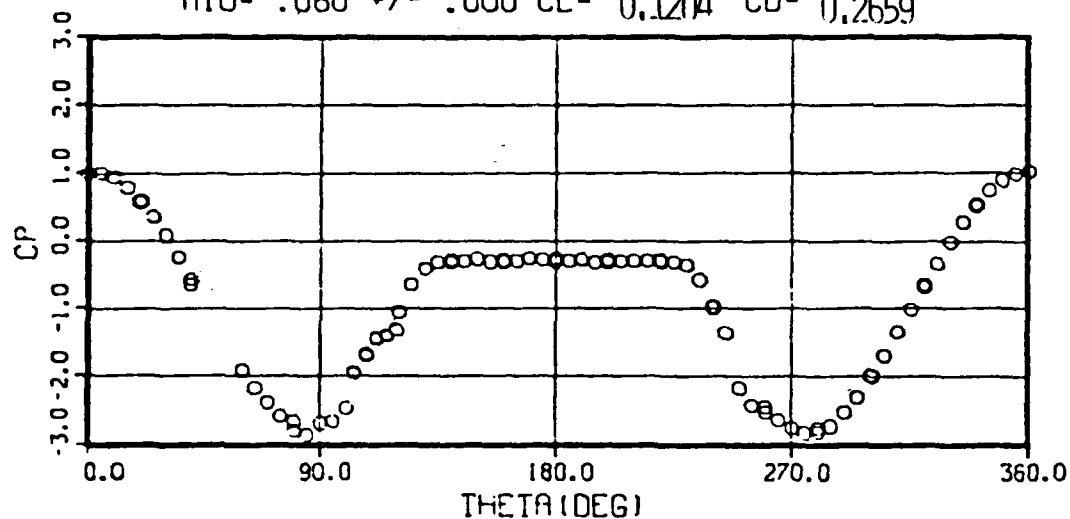
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

PUN 068 OIU- 5.3 +/- .00 RNDIU- .425 +/- .000

PIU- 2094. +/- .00 VIU- 67.68 +/- .000

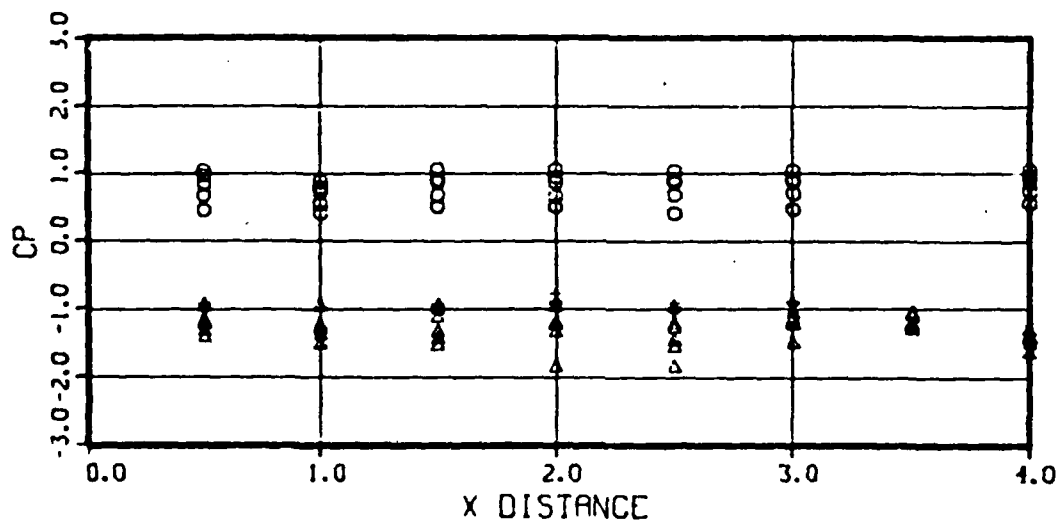
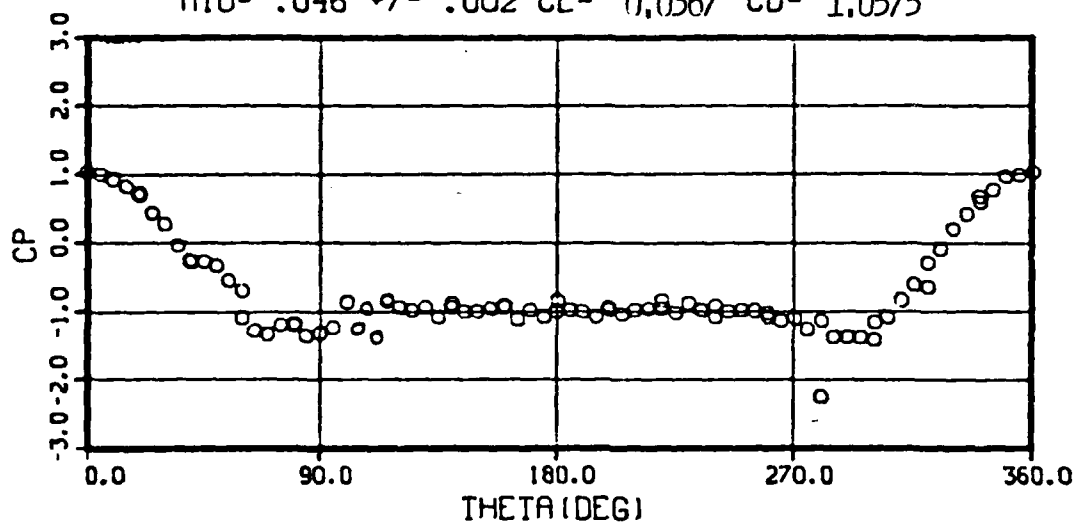
MIU- .060 +/- .000 CL- 0.1204 CD- 0.2659



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 082 OIU- 3.2 +/- .24 RNDIU- .333 +/- .010
 PIU- 2099. +/- .00 VIU- 52.34 +/- 1.488
 MIU- .046 +/- .002 CL- 0.0367 CD- 1.0575



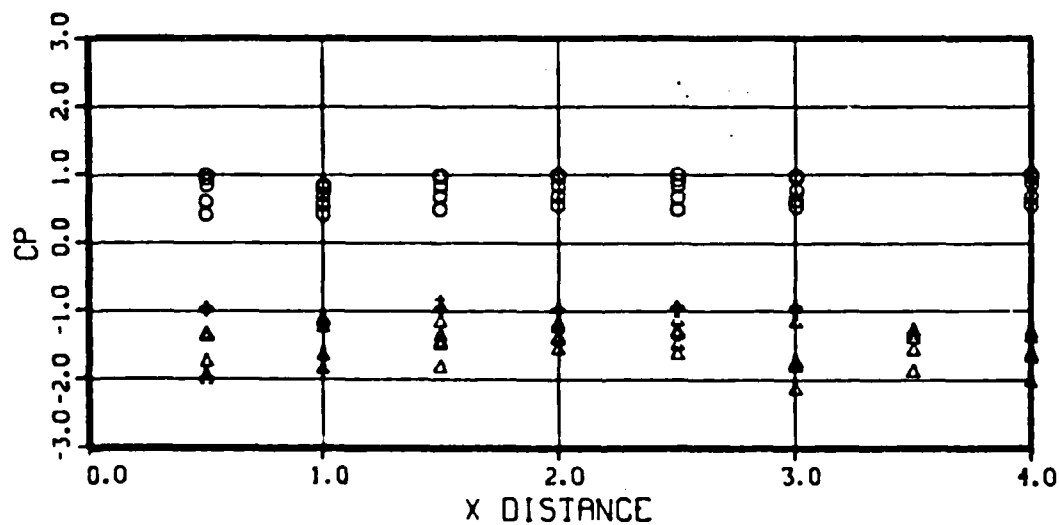
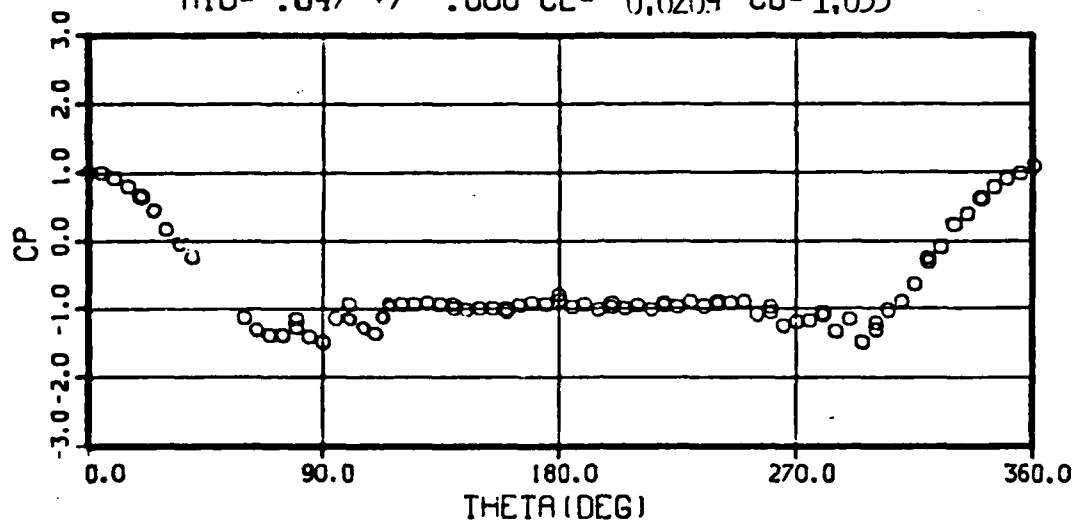
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 081 OIU- 3.3 +/- .08 RNDIU- .338 +/- .003

PIU- 2099. +/- .00 VIU- 53.11 +/- .506

MIU- .047 +/- .000 CL- 0.0209 CD- 1.033



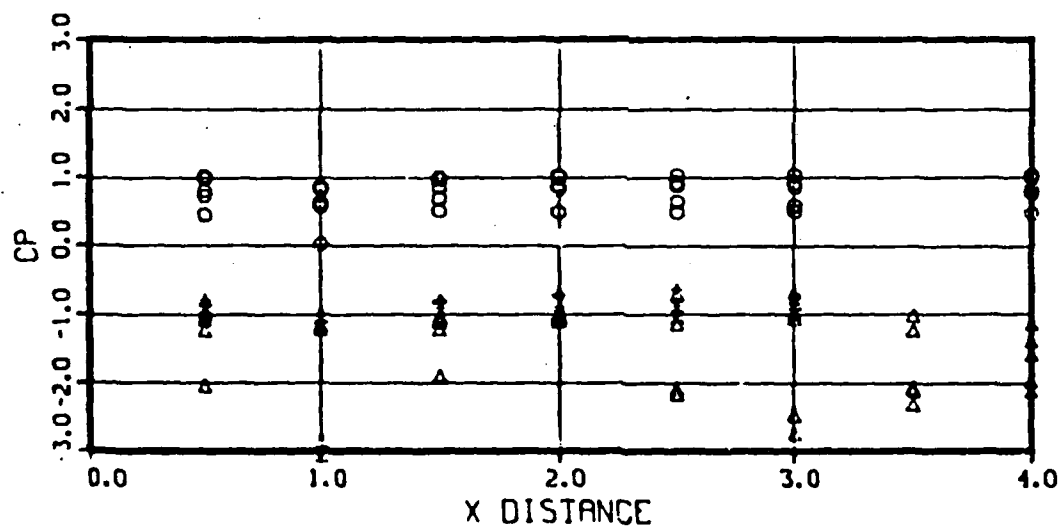
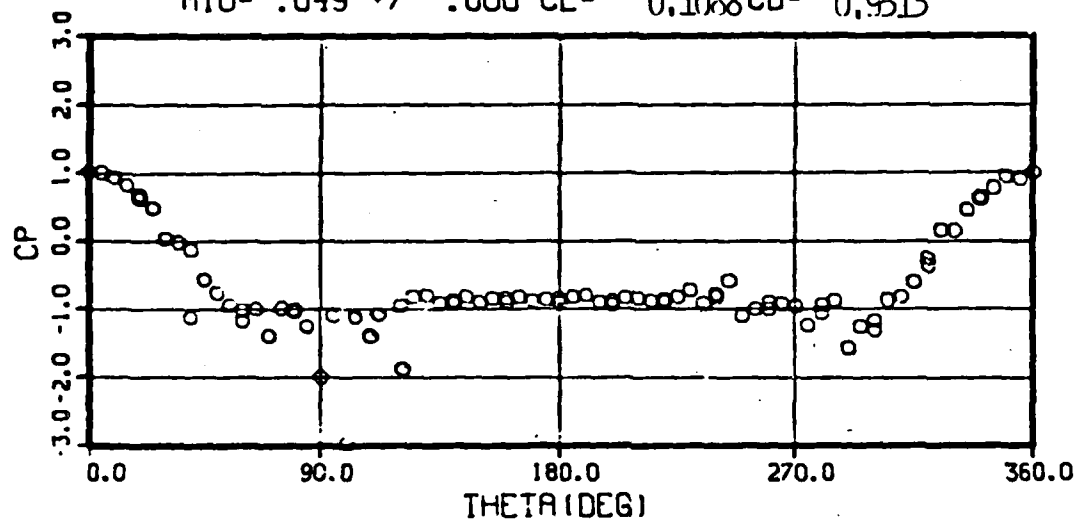
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 080 OIU- 3.5 +/- .00 RNDIU- .350 +/- .000

PIU- 2099. +/- .80 VIU- 55.07 +/- .016

MIU- .049 +/- .000 CL- - 0.1088 CD- 0.9513



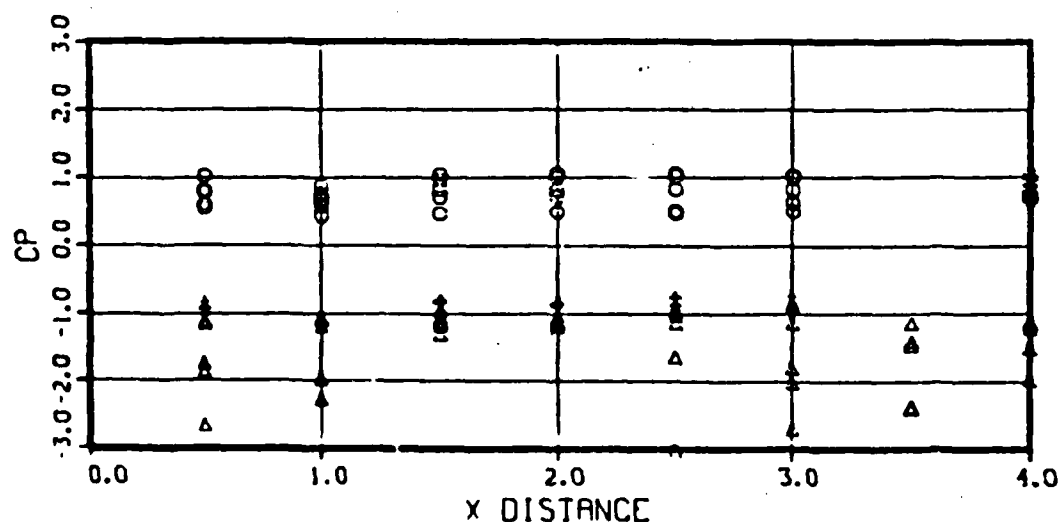
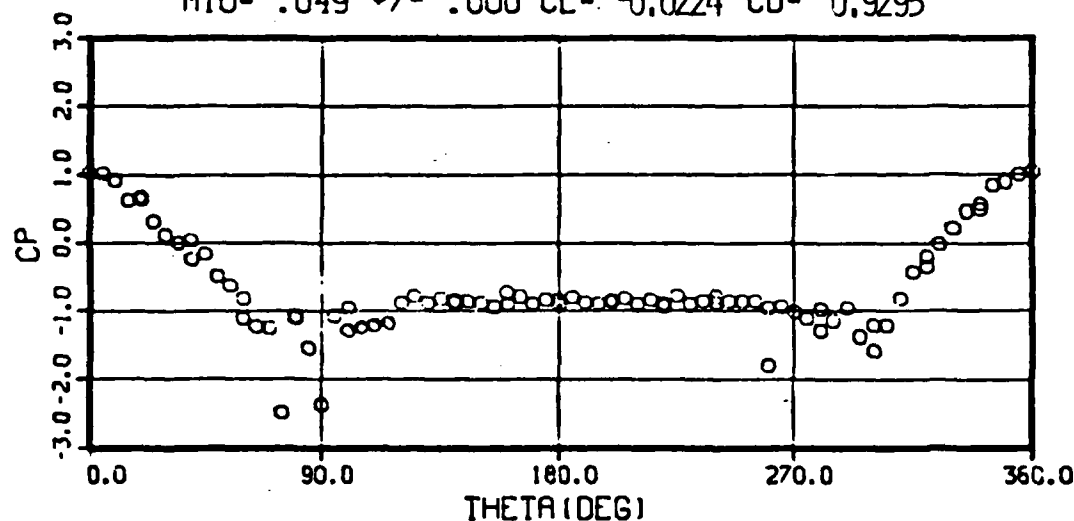
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 079 01U- 3.5 +/- .00 RND1U- .350 +/- .000

PIU- 2098. +/- .00 VIU- 55.10 +/- .006

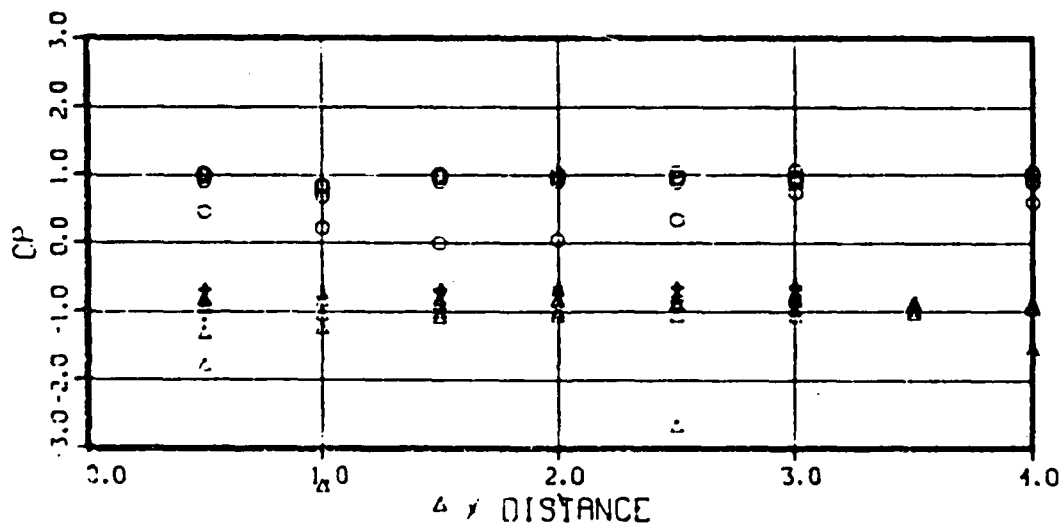
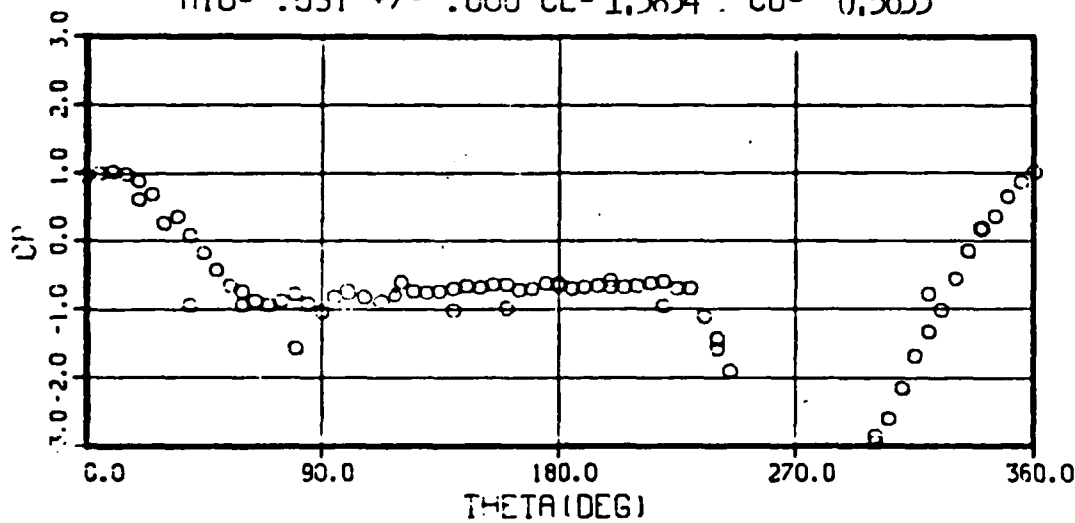
MIU- .049 +/- .000 CL- -0.0224 CD- 0.9295



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

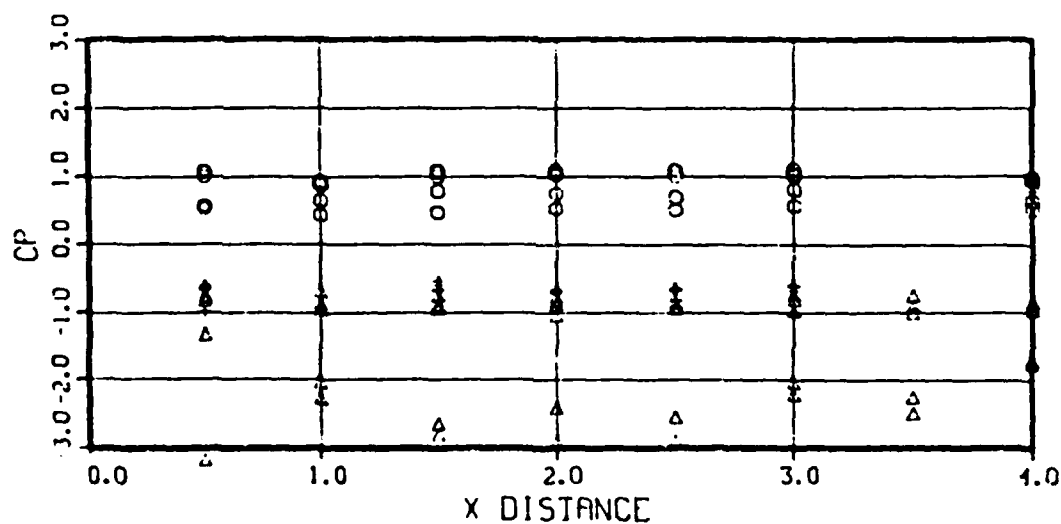
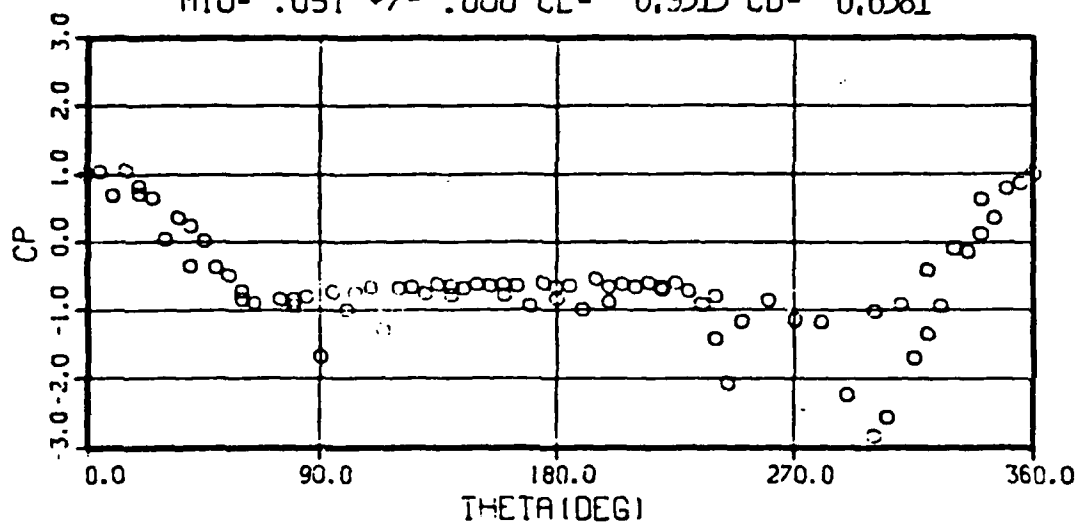
RUN 078 OIU- 3.8 +/- .08 RNDIU- .364 +/- .003
 PIU- 2098. +/- .00 VIU- 57.34 +/- .458
 MIU- .051 +/- .000 CL- 1.3854 CD- 0.5633



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

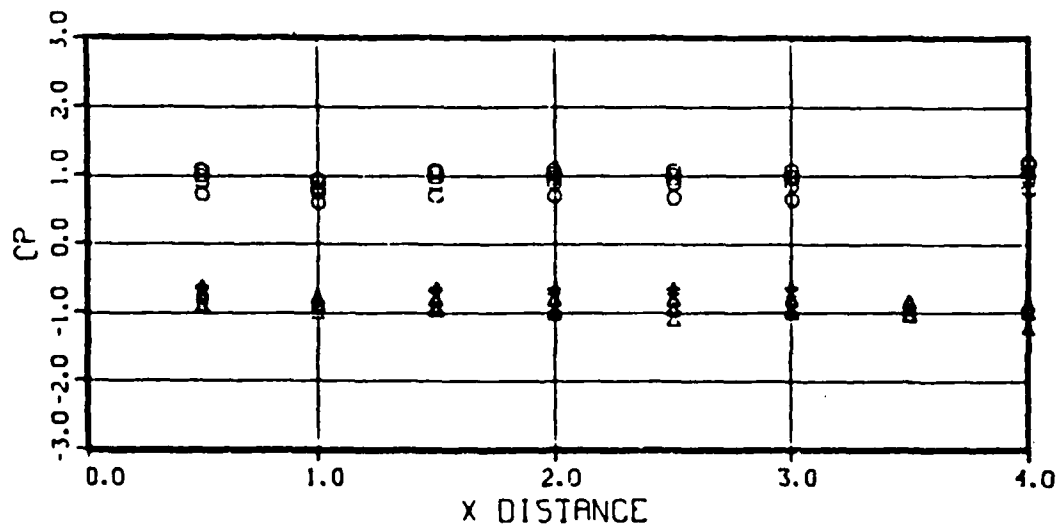
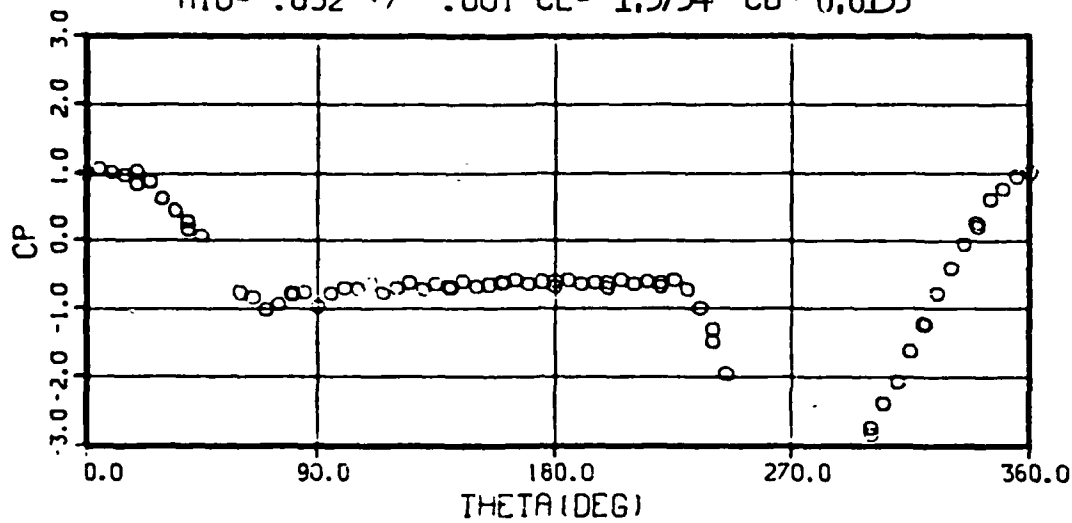
RUN 077 OIU- 3.8 +/- .00 RNDIU- .364 +/- .000
 PIU- 2098. +/- .00 VIU- 57.46 +/- .006
 MIU- .051 +/- .000 CL- 0.9313 CD- 0.6381



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

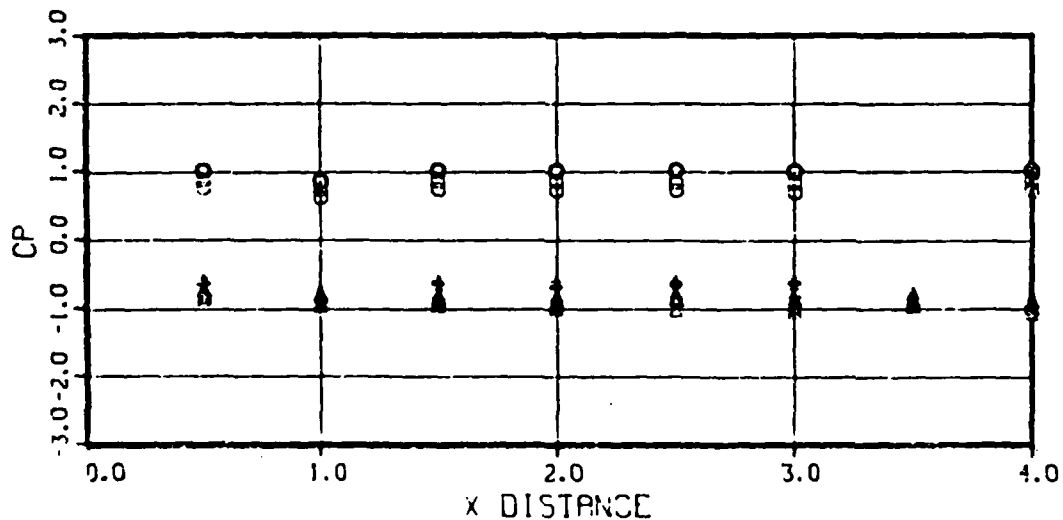
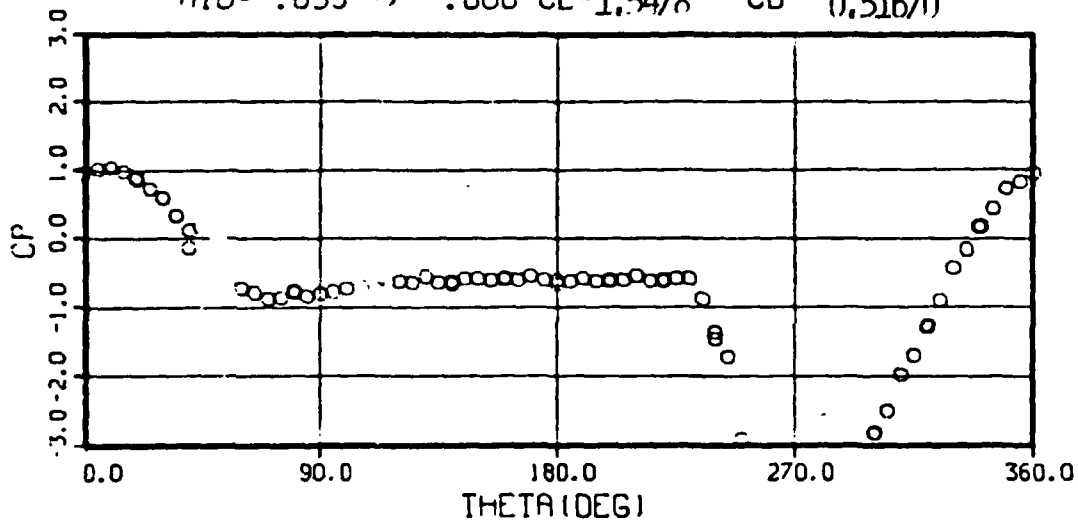
RUN 076 OIU- 4.0 +/- .08 RNDIU- .372 +/- .003
 PIU- 2098. +/- .00 VIU- 58.73 +/- .450
 MIU- .052 +/- .001 CL- 1.5734 CD- 0.6135



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF .4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

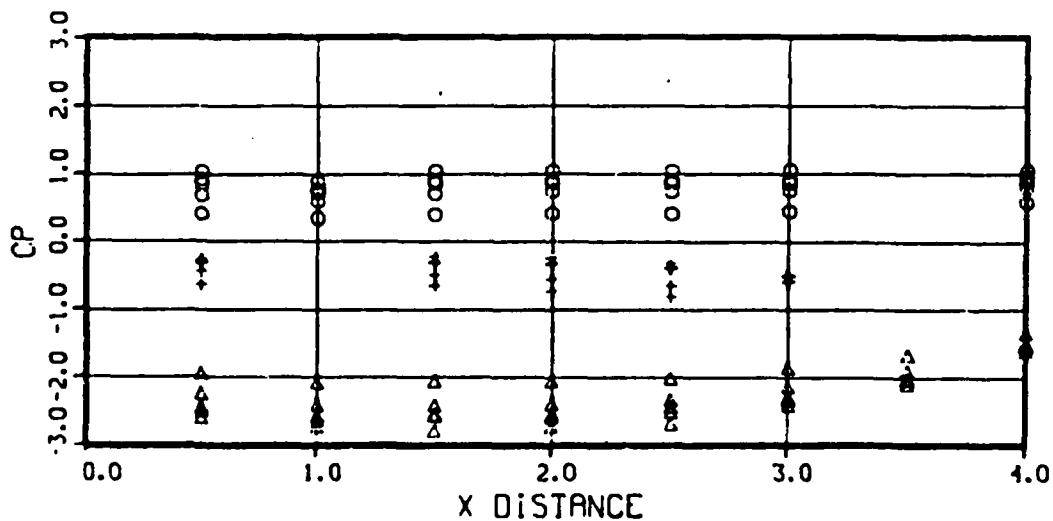
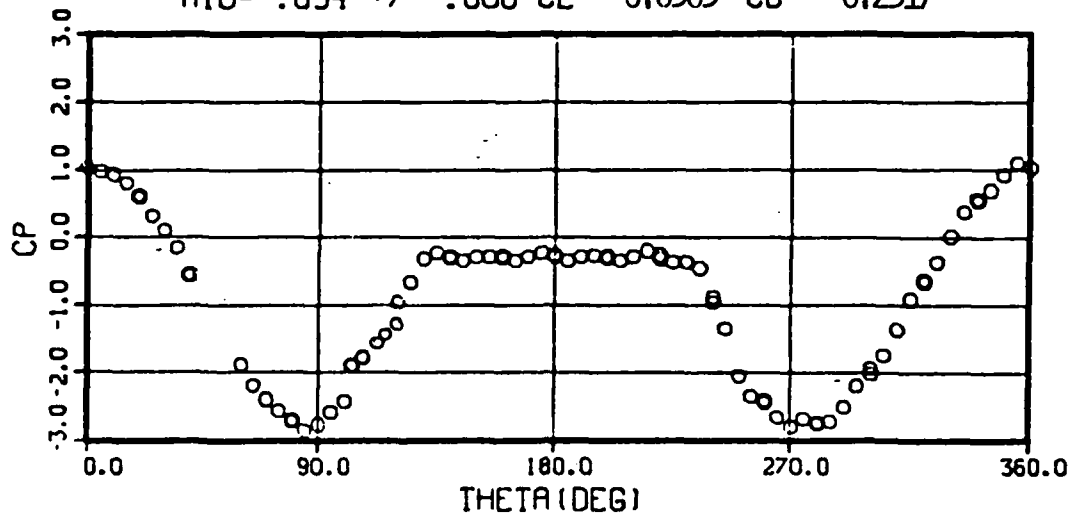
RUN 075 OIU- 4.1 +/- .00 RNDIU- .35 +/- .000
 PIU- 2098. +/- .00 VIU- 59.19 +/- .008
 MIU- .053 +/- .000 CL-1.5478 CD- 0.51670



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

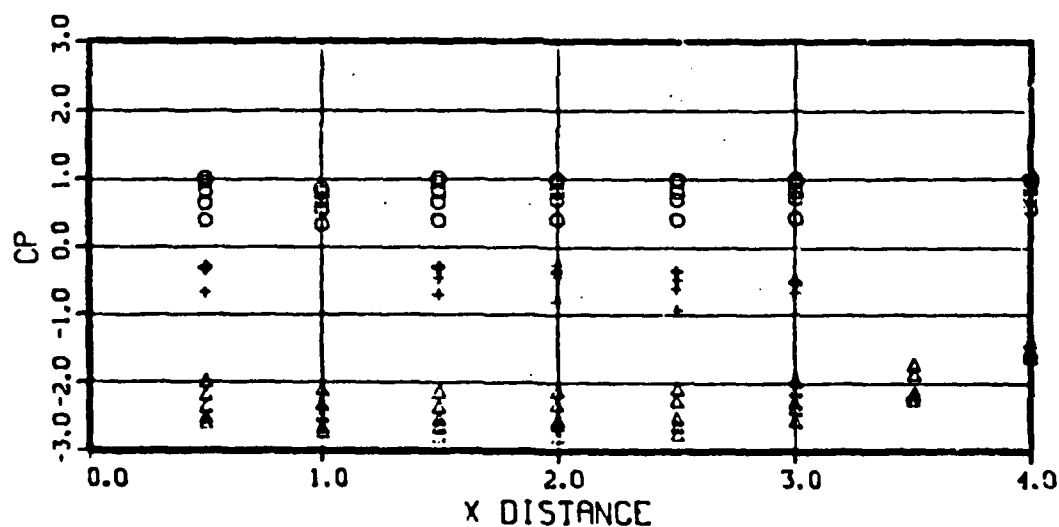
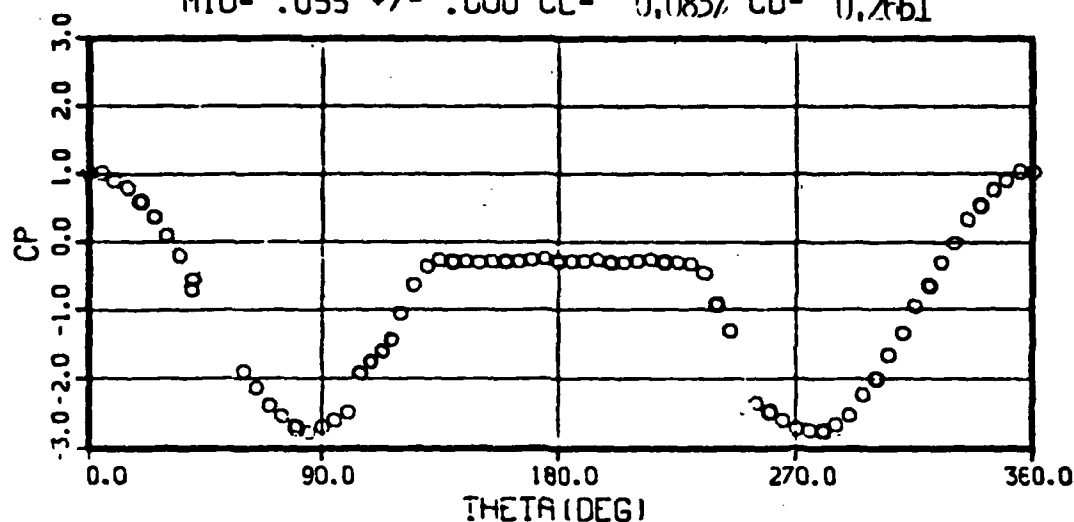
RUN 074 OIU- 4.3 +/- .00 RNDIU- .385 +/- .000
 PIU- 2097. +/- .00 VIU- 60.87 +/- .008
 MIU- .054 +/- .000 CL- 0.0563 CD- 0.2517



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

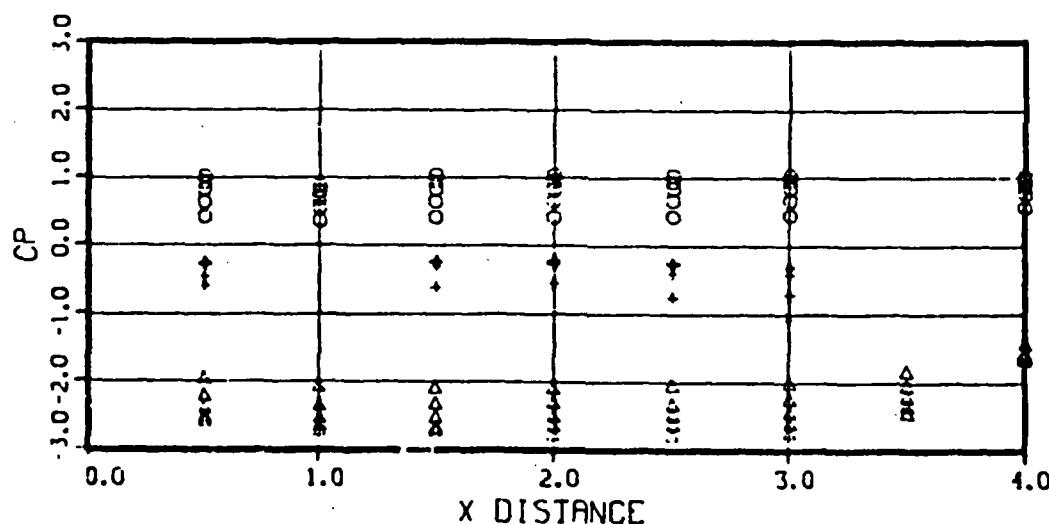
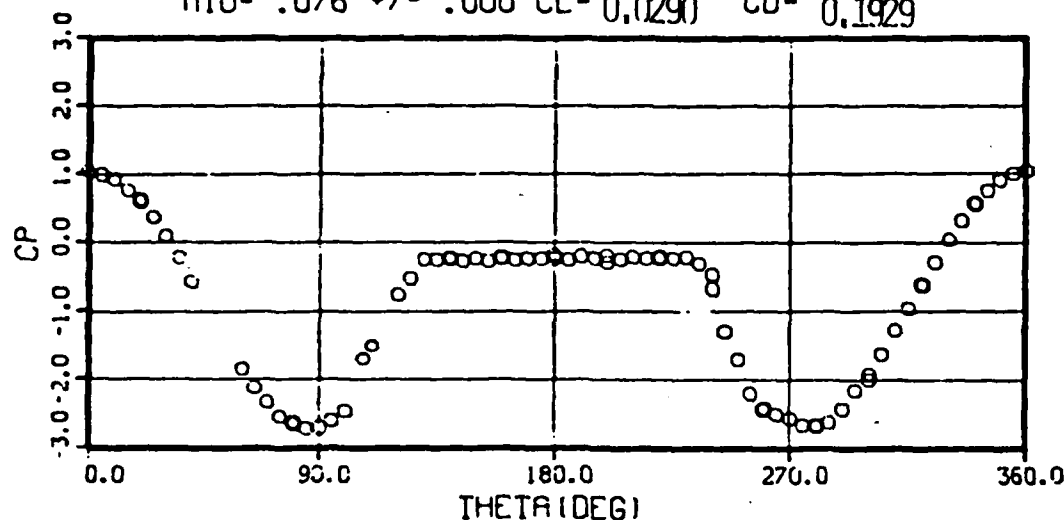
RUN 073 OIU- 4.5 +/- .00 RNDIU- .395 +/- .001
 PIU- 2096. +/- .00 VIU- 62.50 +/- .010
 MIU- .055 +/- .000 CL- 0.0837 CD- 0.2651



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

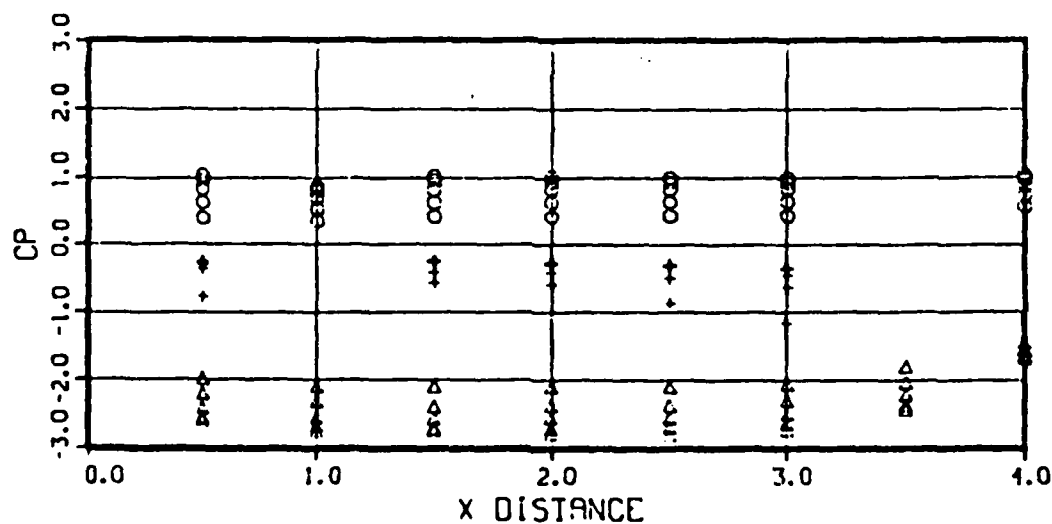
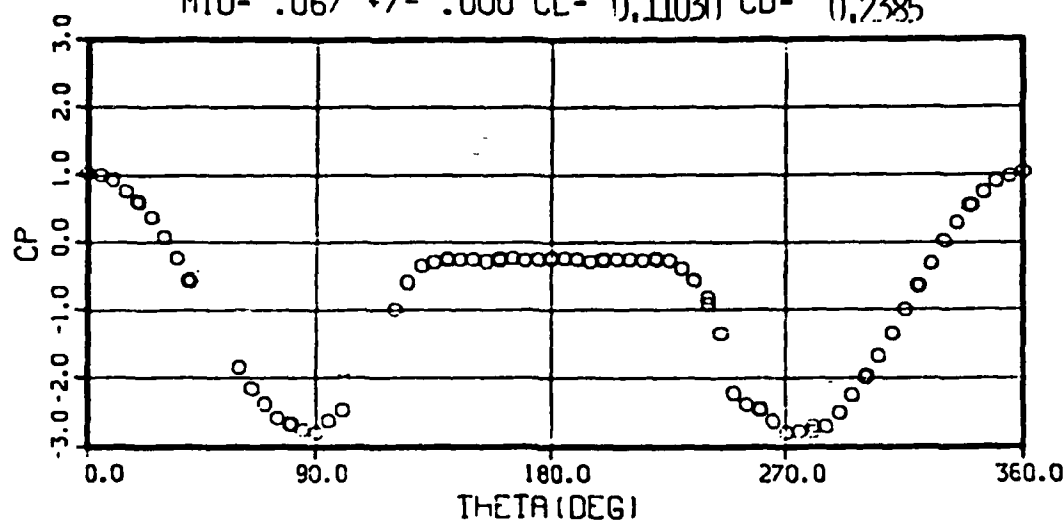
RUN 072 QIU- 8.5 +/- .06 RNDIU- .539 +/- .001
 PIU- 2092. +/- .00 VIU- 85.62 +/- .248
 MIU- .076 +/- .000 CL- 0.0290 CD- 0.1929



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

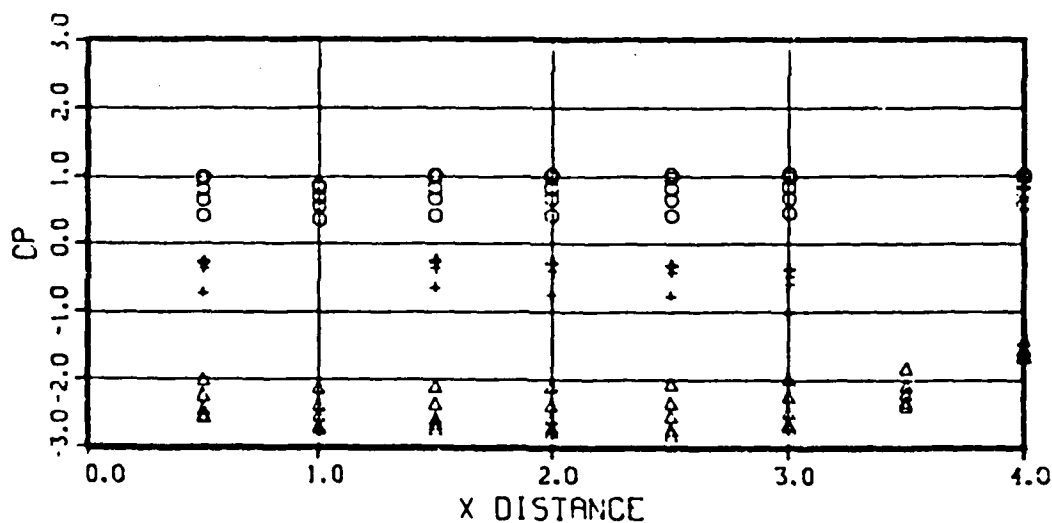
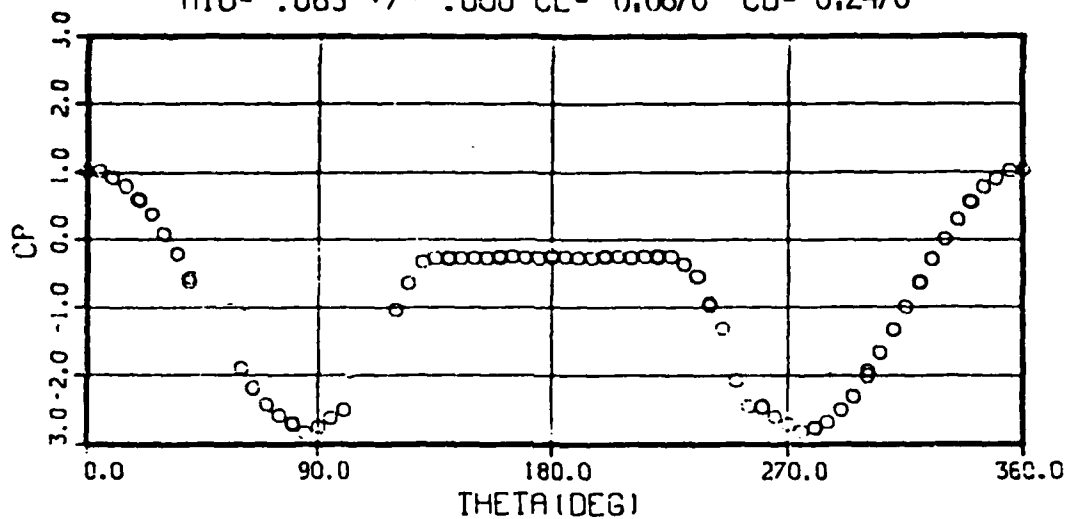
RUN 071 CIU- 6.6 +/- .00 RNDIU- .478 +/- .000
 PIU- 2093. +/- .00 VIU- 75.94 +/- .006
 MIU- .067 +/- .000 CL- 0.11030 CD- 0.2385



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

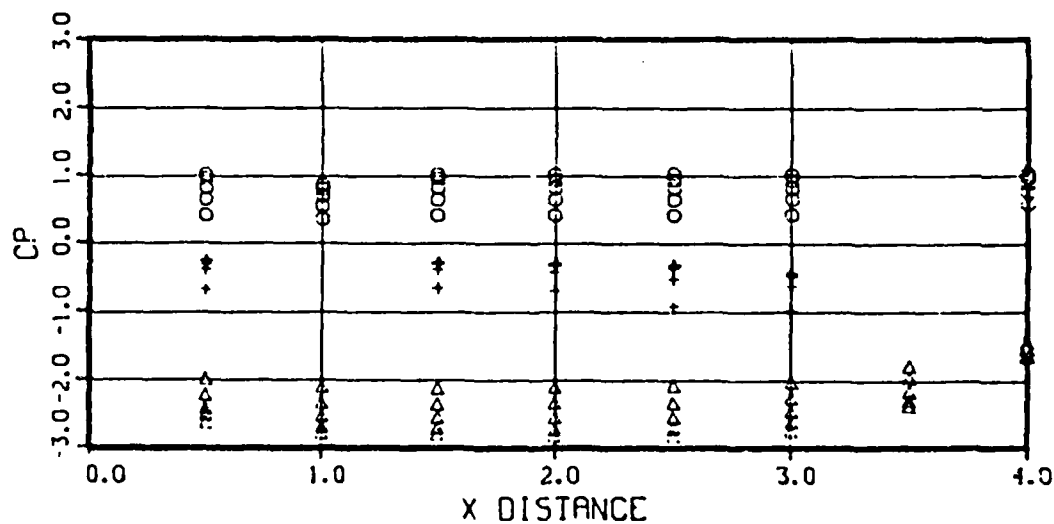
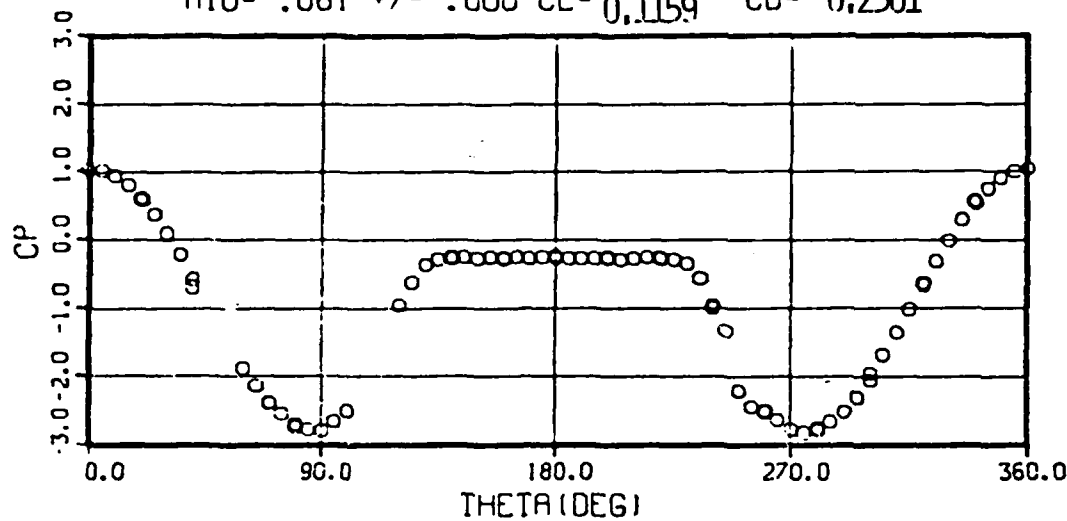
RUN 070 OIU- 5.8 +/- .00 RNDIU- .447 +/- .000
 PIU- 2094. +/- .00 VIU- 70.99 +/- .008
 MIU- .063 +/- .000 CL- 0.0876 CD- 0.2476



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

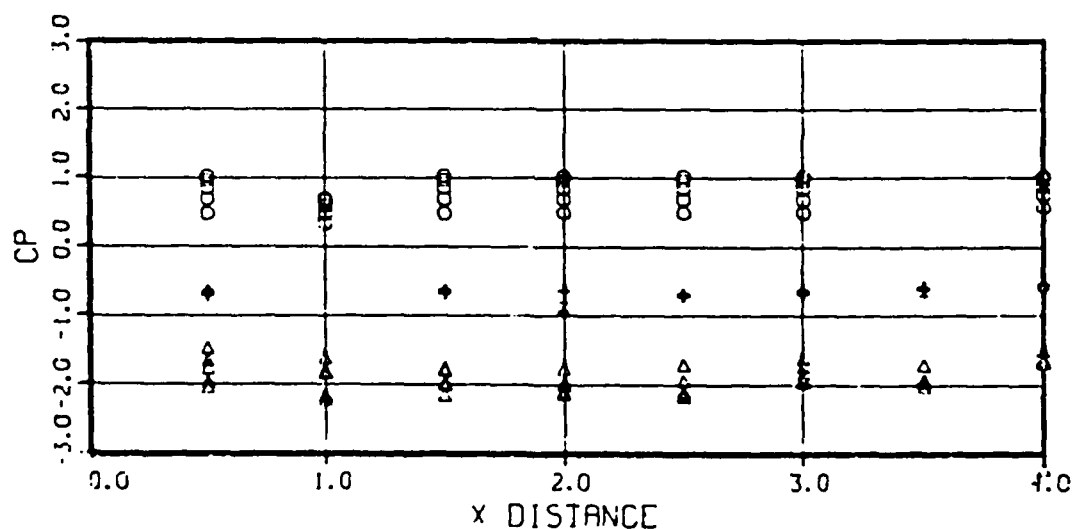
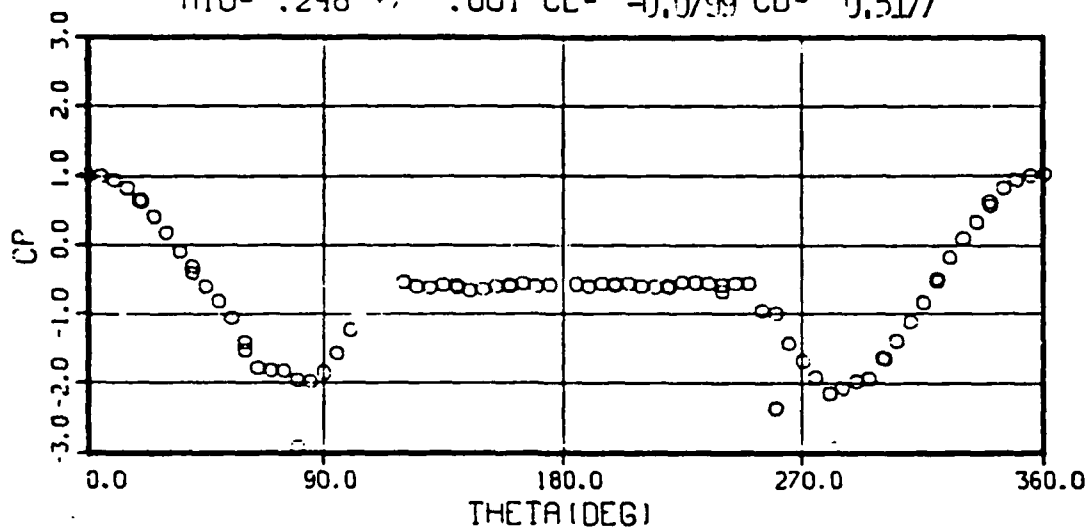
RUN 069 QIU- 5.4 +/- .00 RNDIU- .432 +/- .000
 PIU- 2094. +/- .80 VIU- 68.64 +/- .016
 MIU- .061 +/- .000 CL- 0.1159 CD- 0.2501



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 091 OIU-431.4 +/- 2.10 RNDIU-8.063 +/- .005
 PIU-10030. +/- 3.20 VIU-284.56 +/- .936
 MIU- .248 +/- .001 CL- -0.0799 CD- 0.5177



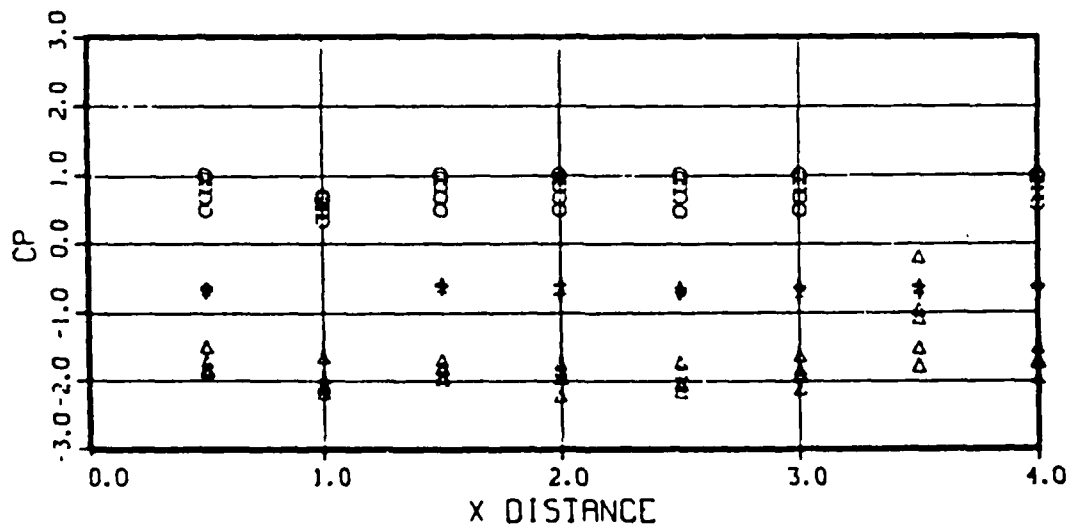
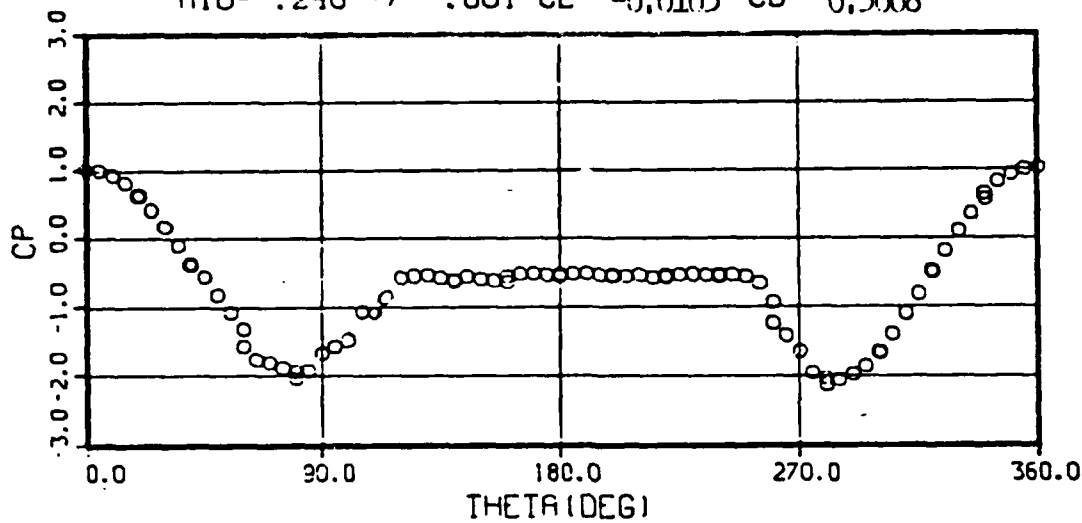
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 092 01U-382.5 +/- 2.48 RND1U-7.146 +/- .019

PIU- 8899. +/- 8.00 VIU-284.55 +/- 1.066

MIU- .248 +/- .001 CL- -0.0105 CD- 0.5068



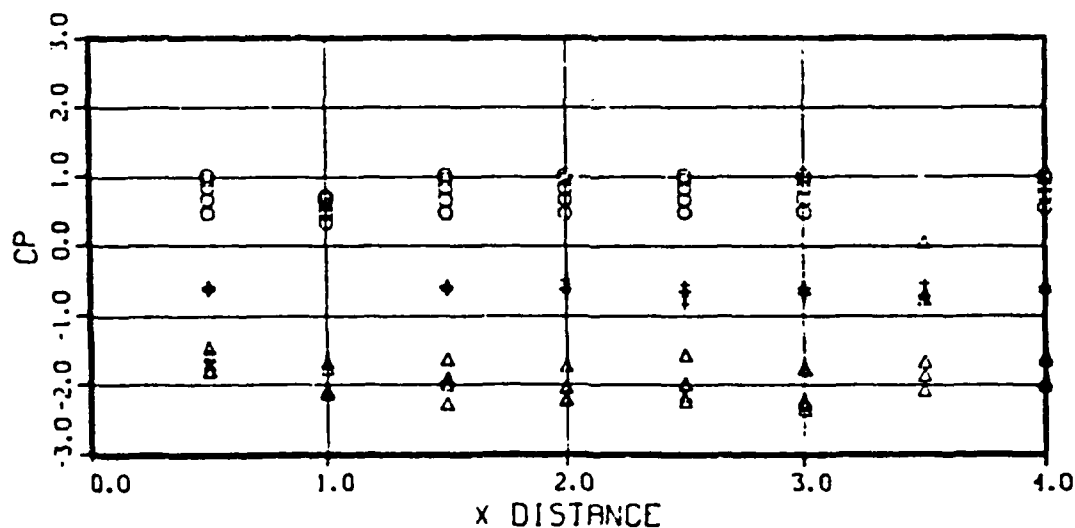
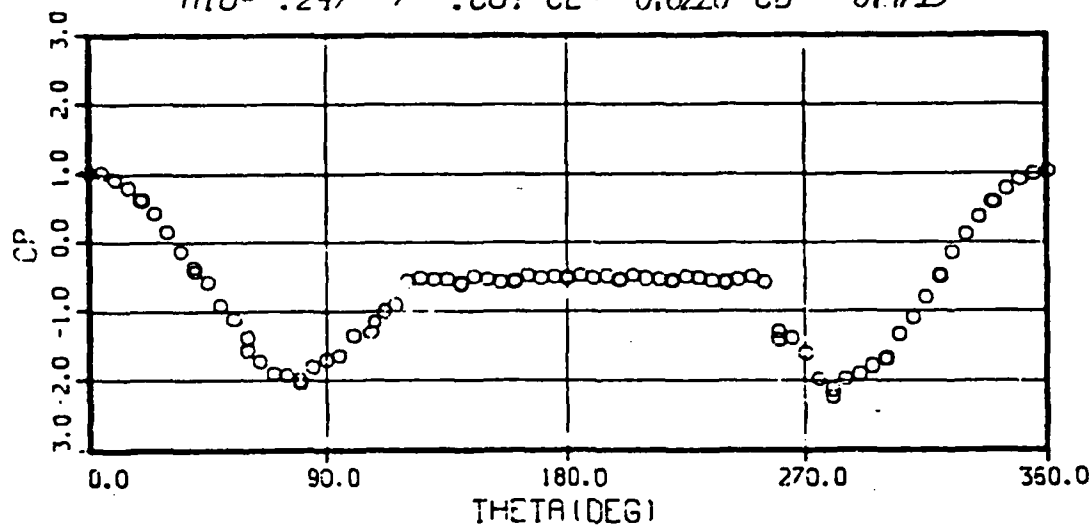
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF: 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 093 OIU-329.2 +/- 1.68 RNDIU-6.129 +/- .018

PIU- 7684. +/- 2.00 VIU-284.67 +/- .800

MIU- .247 +/- .001 CL- -0.0220 CD- 0.4715



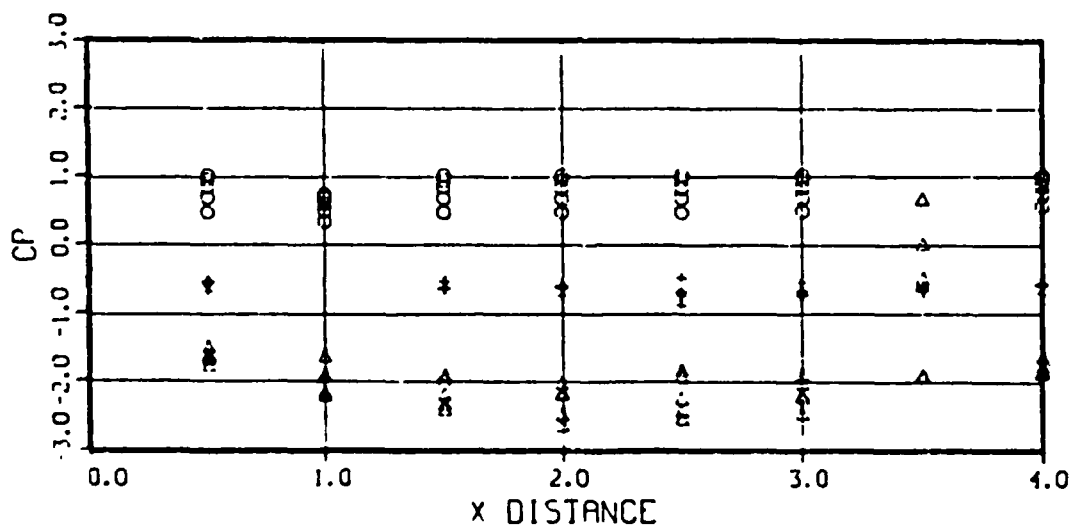
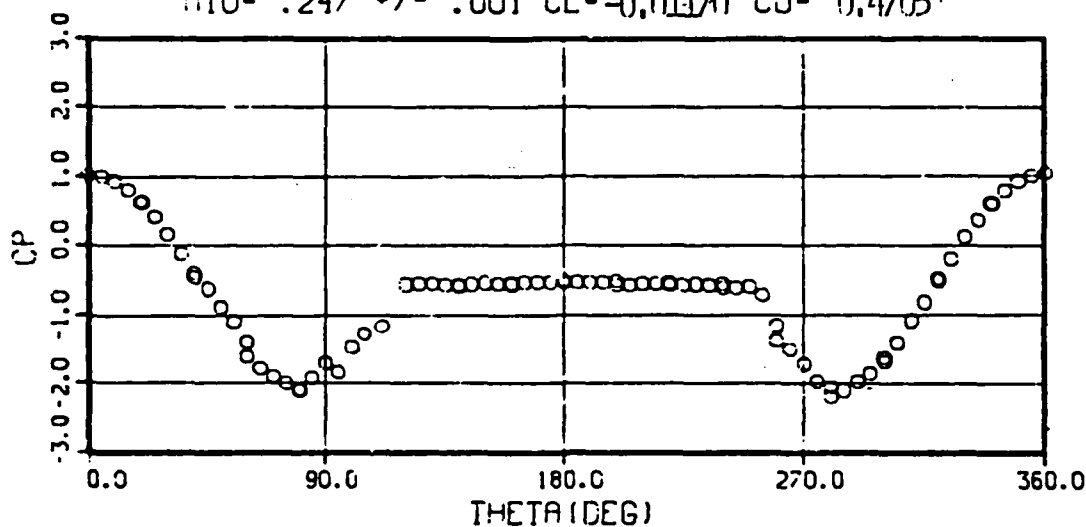
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 094 OIU-272.1 +/- 1.58 RNDIU-5.098 +/- .021

PIU- 6364. +/- 6.60 VIU-283.79 +/- .728

MIU- .247 +/- .001 CL-0.01170 CD- 0.4705



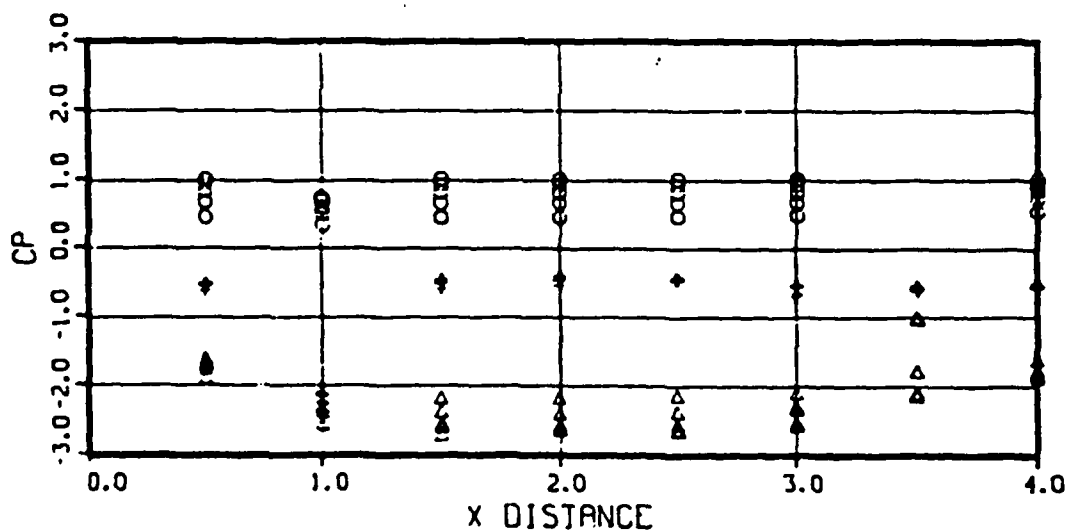
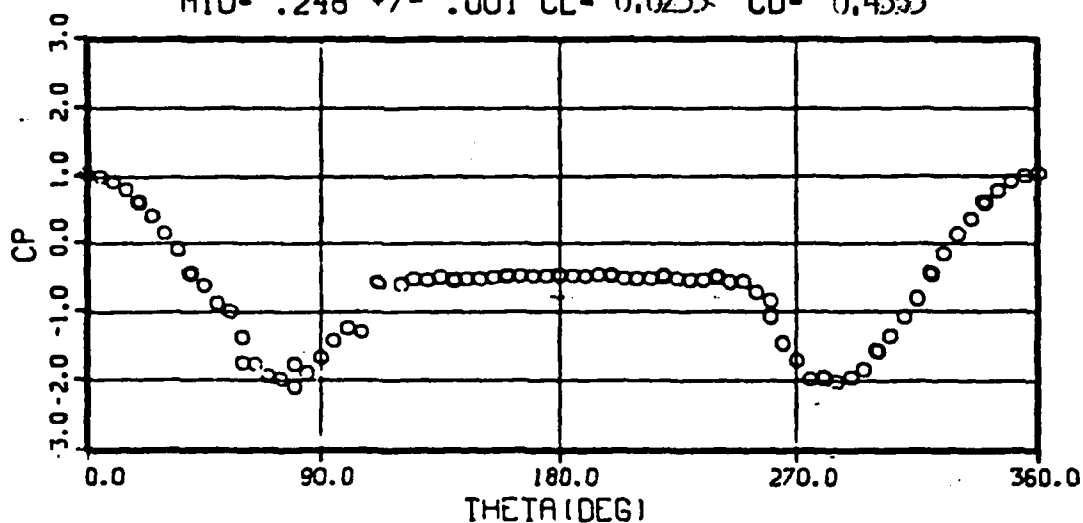
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 095 QIU-219.0 +/- 1.32 RNDIU-4.129 +/- .007

PIU- 5104. +/- 10.00 VIU-283.40 +/- 1.014

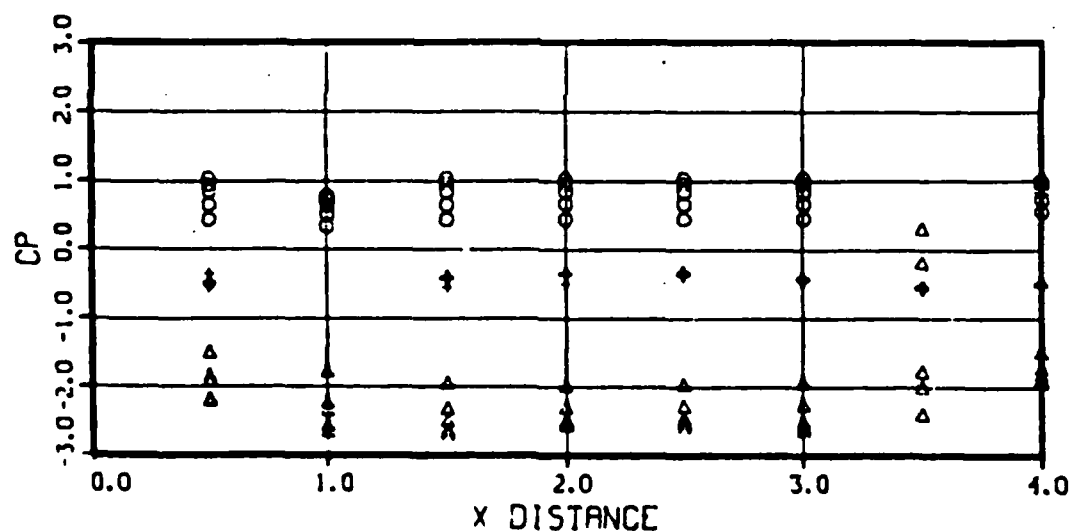
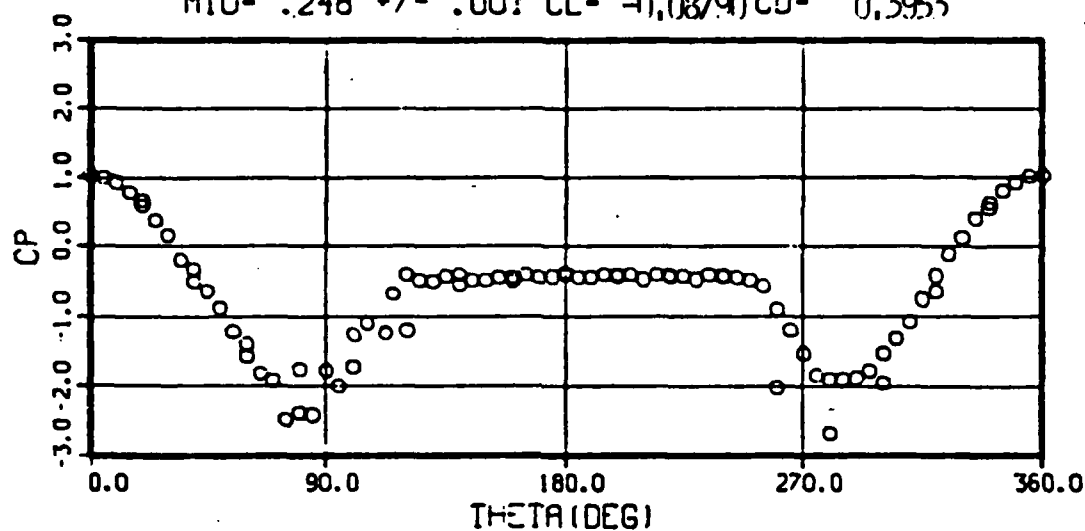
MIU- .248 +/- .001 CL- 0.0253 CD- 0.4553



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

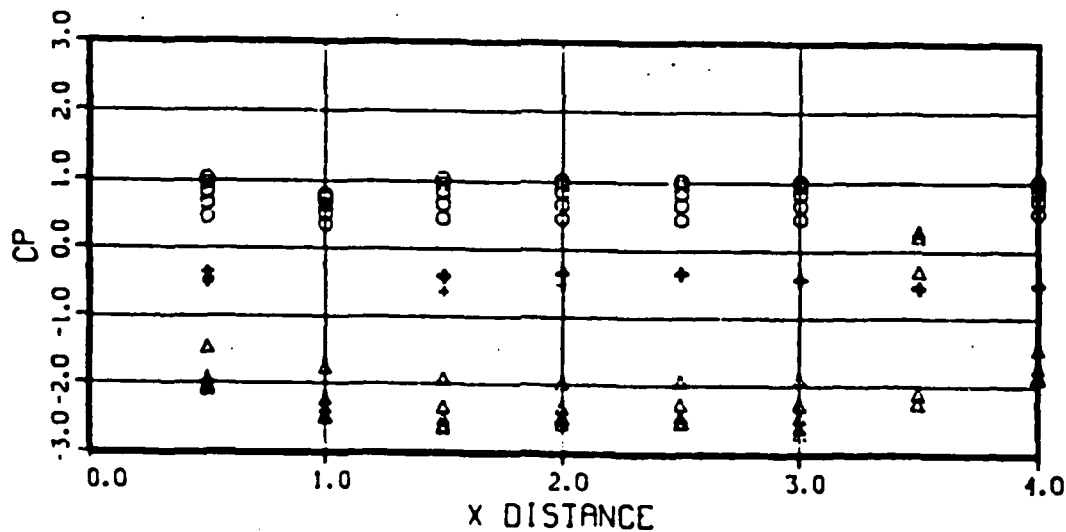
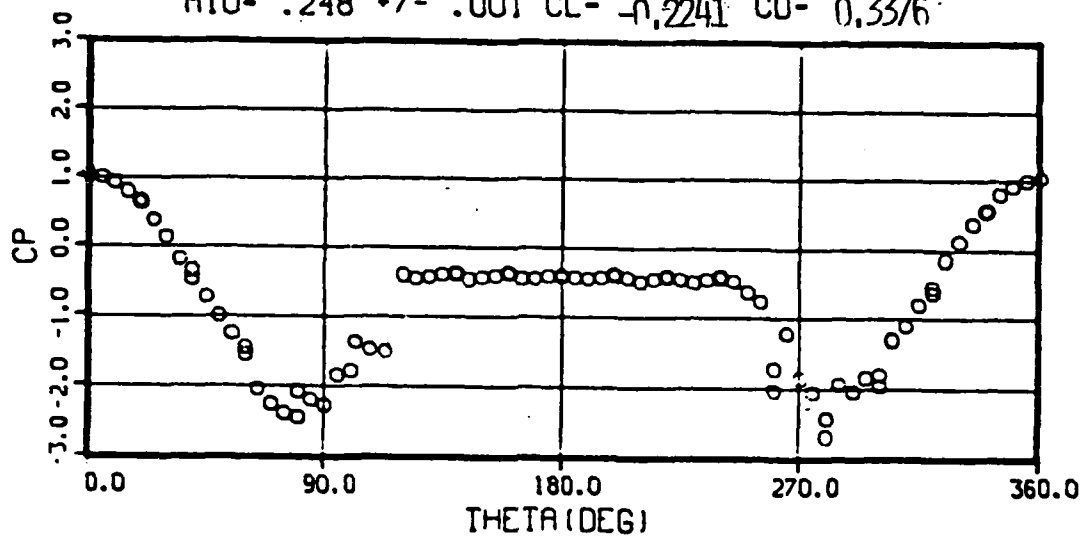
RUN C96 OIU-16: .3 +/- .42 RNDIU-3.066 +/- .010
 PIU- 3756. +/- 8.40 VIU-282.52 +/- .564
 MIU- .248 +/- .001 CL- -0.0879 CD- 0.3953



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 097 OIU-135.2 +/- .80 RNDIU-2.569 +/- .013
 PIU- 3141. +/- 5.20 VIU-282.77 +/- .868
 MIU- .248 +/- .001 CL- -0.2241 CD- 0.3376



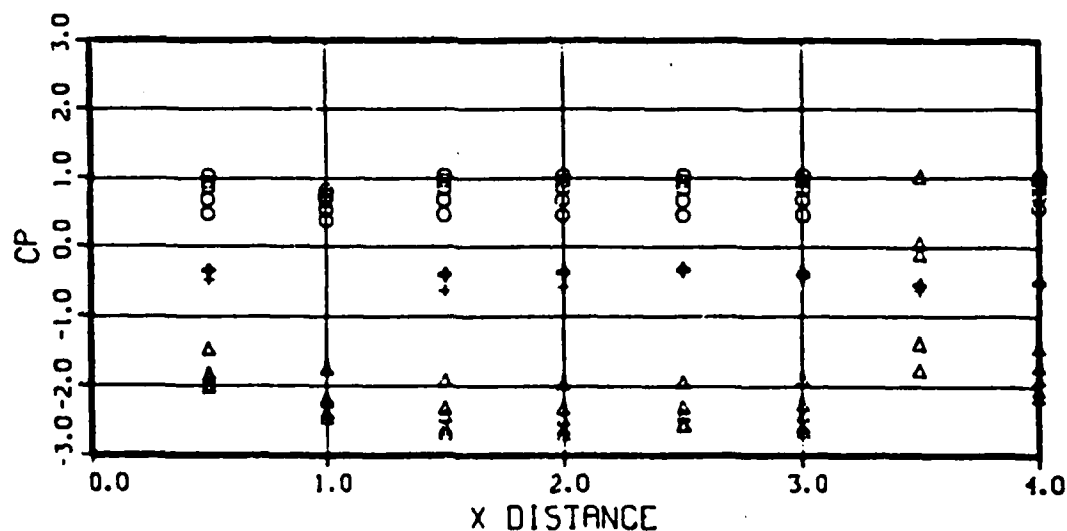
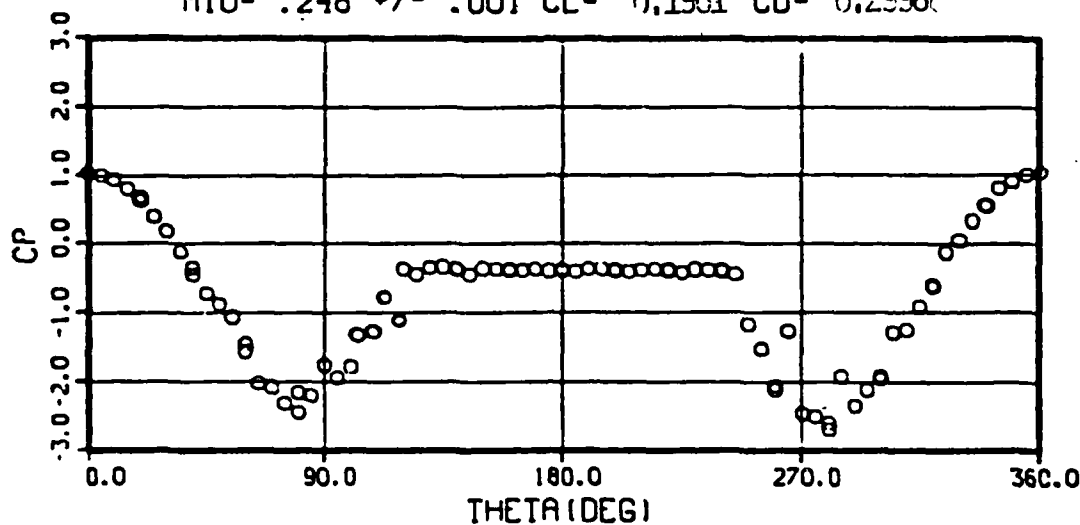
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 098 OIU-107.4 +/- 1.20 RNDIU-2.050 +/- .012

PIU- 2497. +/- 5.40 VIU-282.21 +/- 1.694

MIU- .248 +/- .001 CL- 0.1961 CD- 0.2998



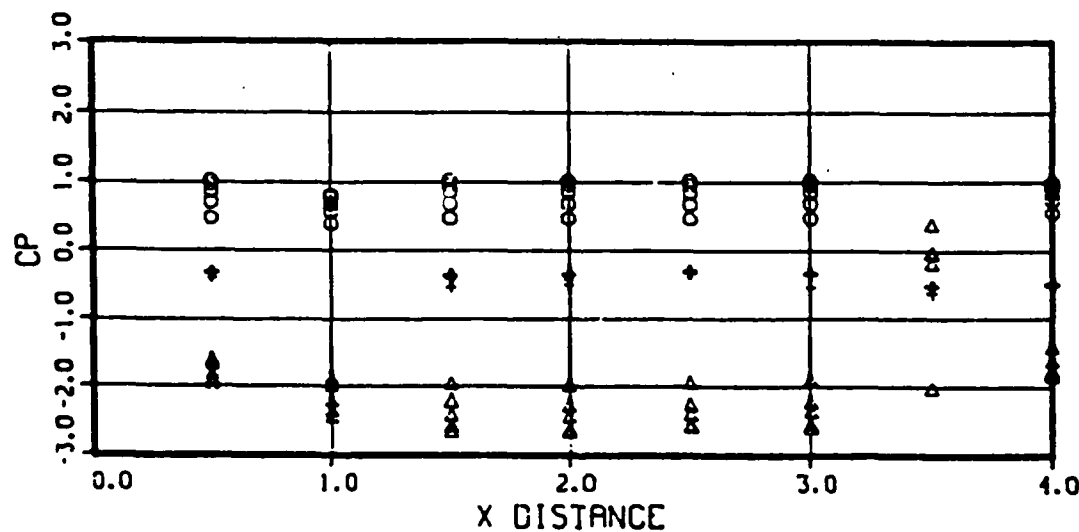
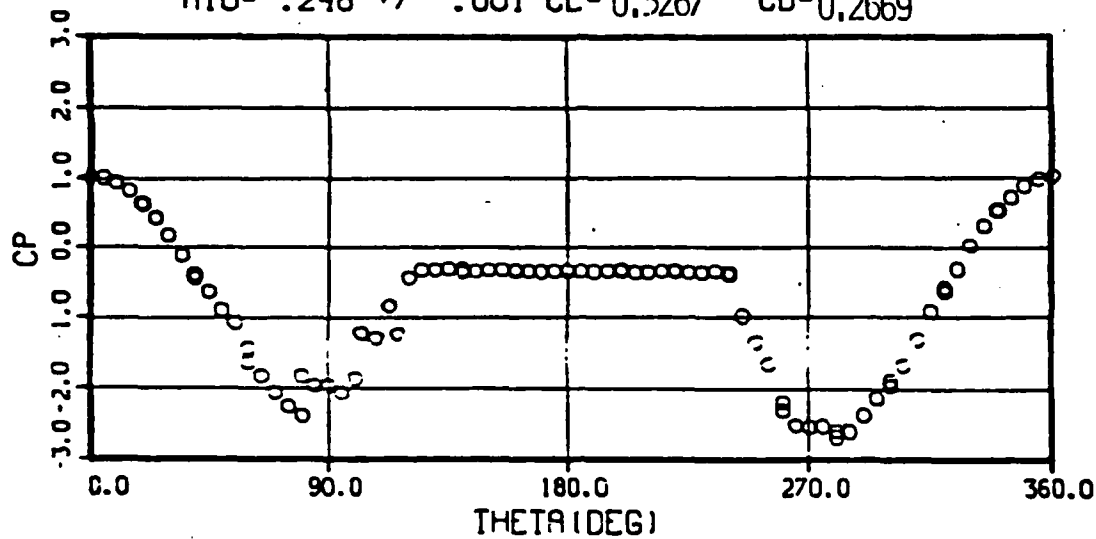
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 099 OIU- 80.3 +/- .20 RNDIU-1.535 +/- .002

PIU- 1856. +/- 4.40 VIU-282.51 +/- .326

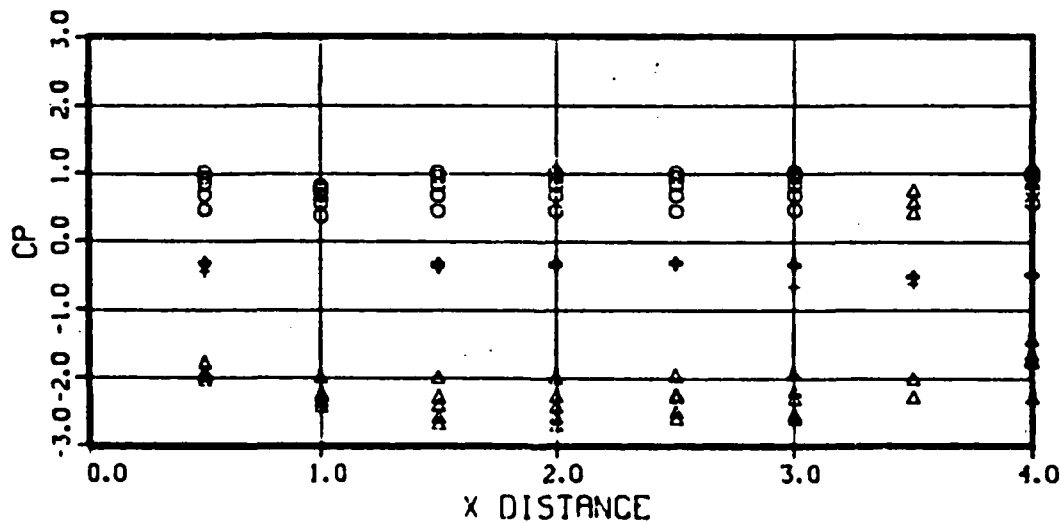
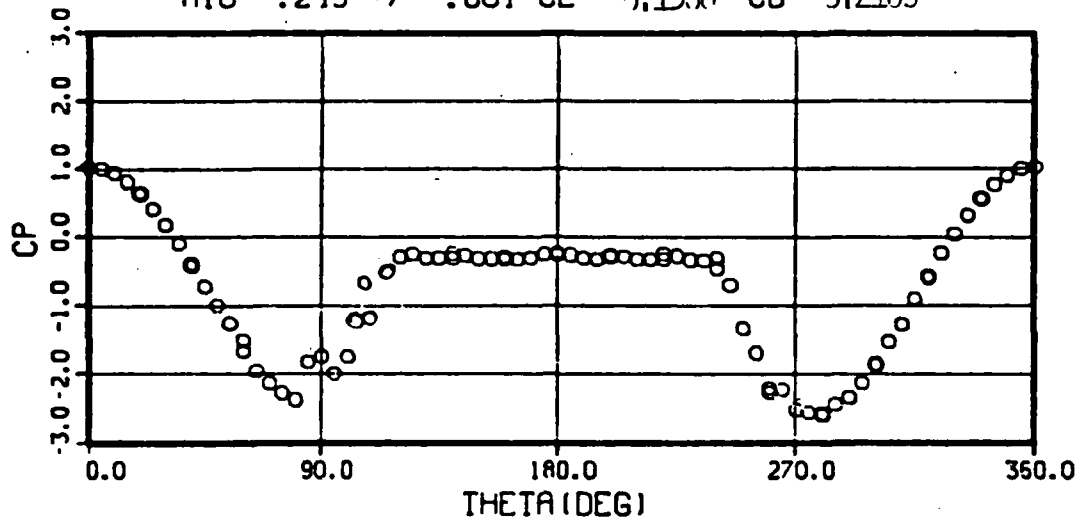
MIU- .248 +/- .001 CL- 0.3267 CD-0.2669



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 100 OIU- 67.1 +/- .16 RNDIU-1.280 +/- .003
 PIU- 1540. +/- 2.20 VIU-283.25 +/- .238
 MIU- .249 +/- .001 CL- 0.1506 CD- 0.2109



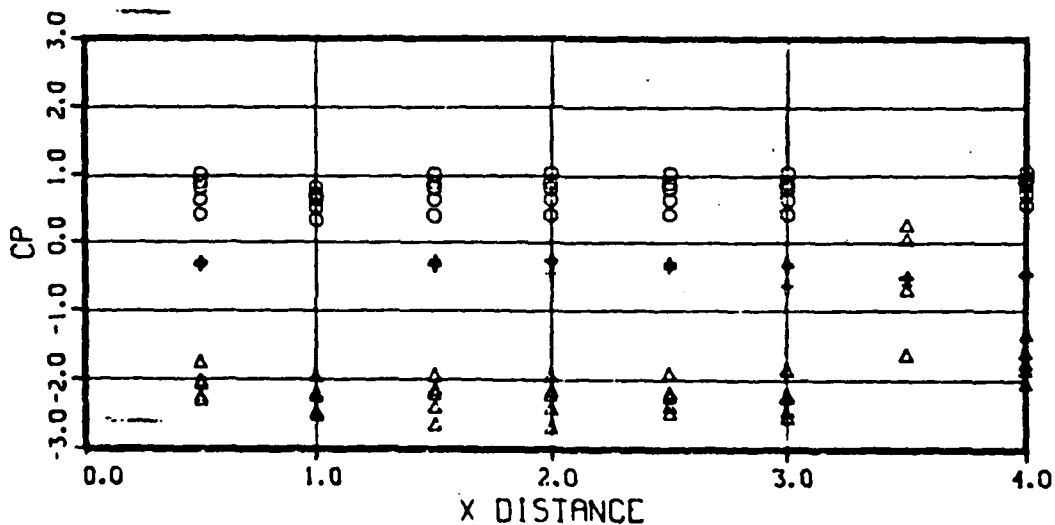
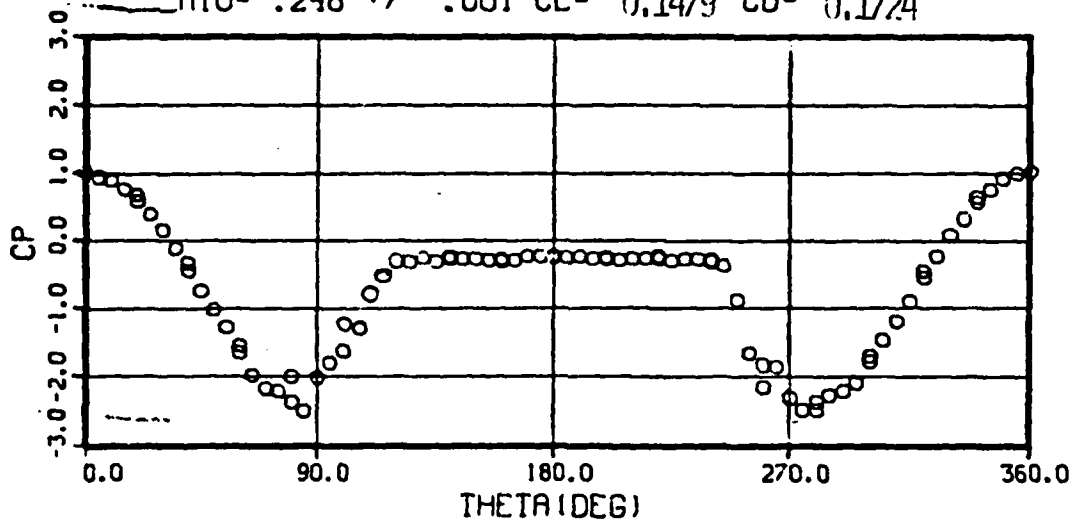
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF. 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 101 OIU- 54.0 +/- .32 RNDIU-1.040 +/- .004

PIU- 1252. +/- 4.00 VIU-281.49 +/- 1.010

MIU- .248 +/- .001 CL- 0.1479 CD- 0.1724



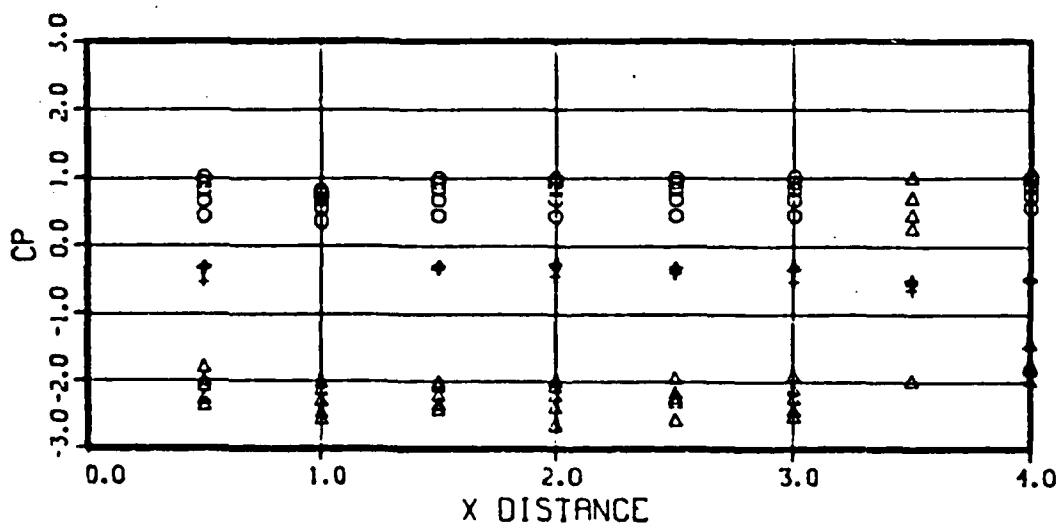
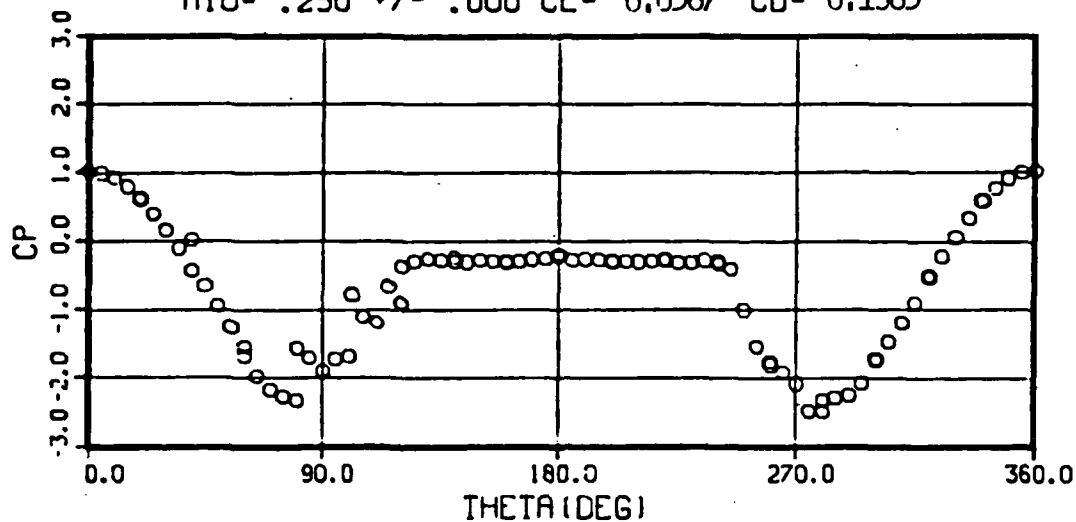
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 102 OIU- 48.5 +/- .10 RNDIU- .929 +/- .002

PIU- 1110. +/- 2.80 VIU-283.15 +/- .506

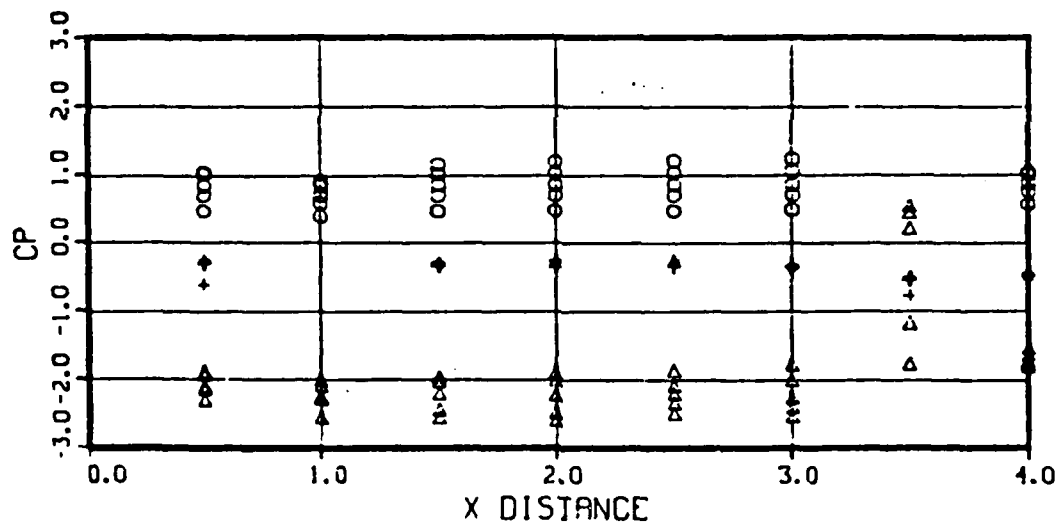
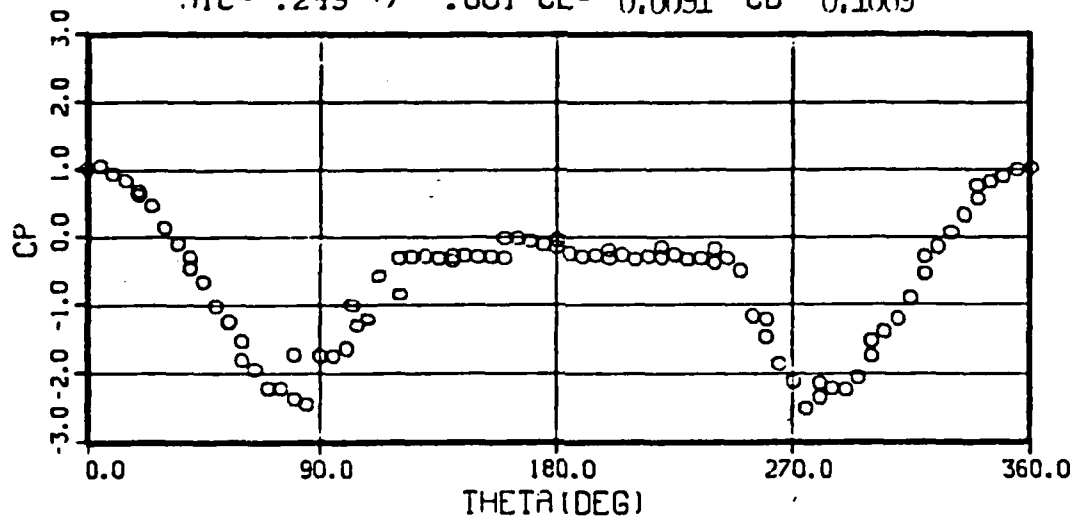
MIU- .250 +/- .000 CL- 0.0387 CD- 0.1983



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

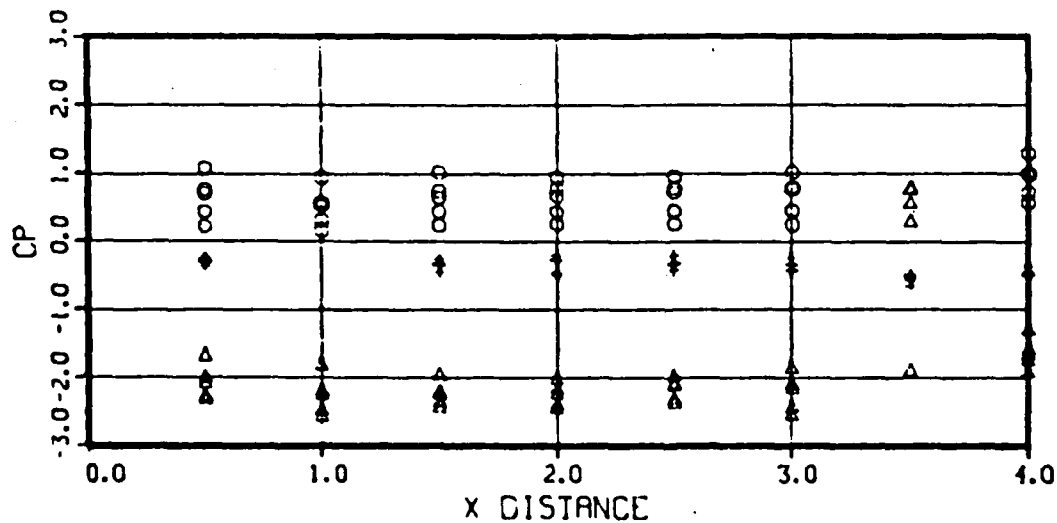
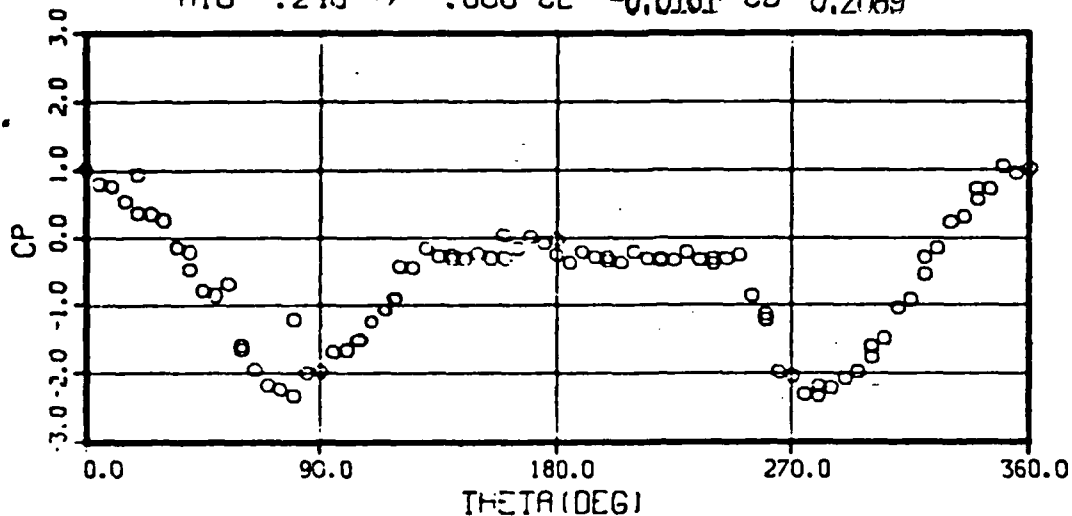
RUN 103 OIU- 42.5 +/- .14 RNDIU- .819 +/- .002
 PIU- 979. +/- 3.20 VIU-282.09 +/- .588
 MIU- .249 +/- .001 CL- 0.0091 CD- 0.1669



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 104 OIU- 37.0 +/- .00 RNDIU- .715 +/- .001
 PIU- 858. +/- 2.60 VIU-280.91 +/- .170
 MIU- .248 +/- .000 CL- -0.0161 CD- 0.2089



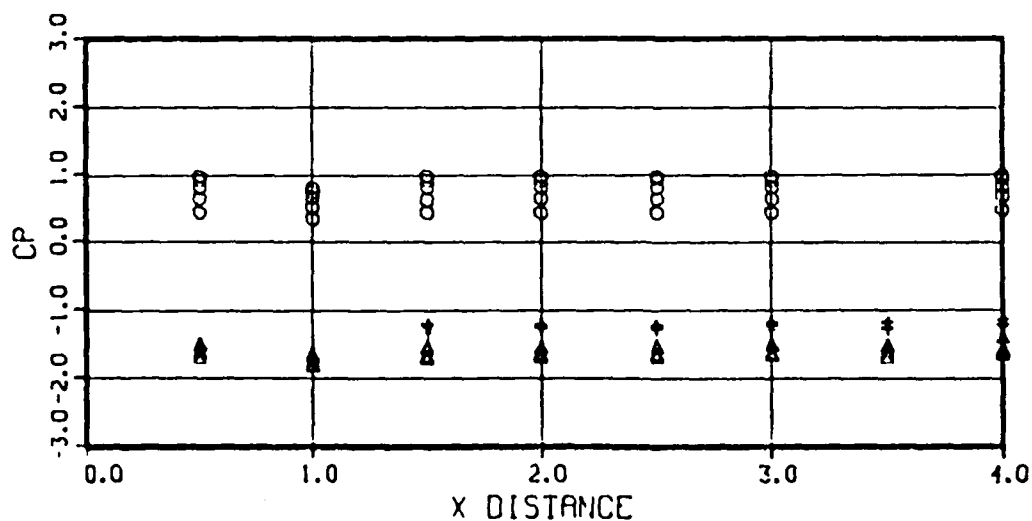
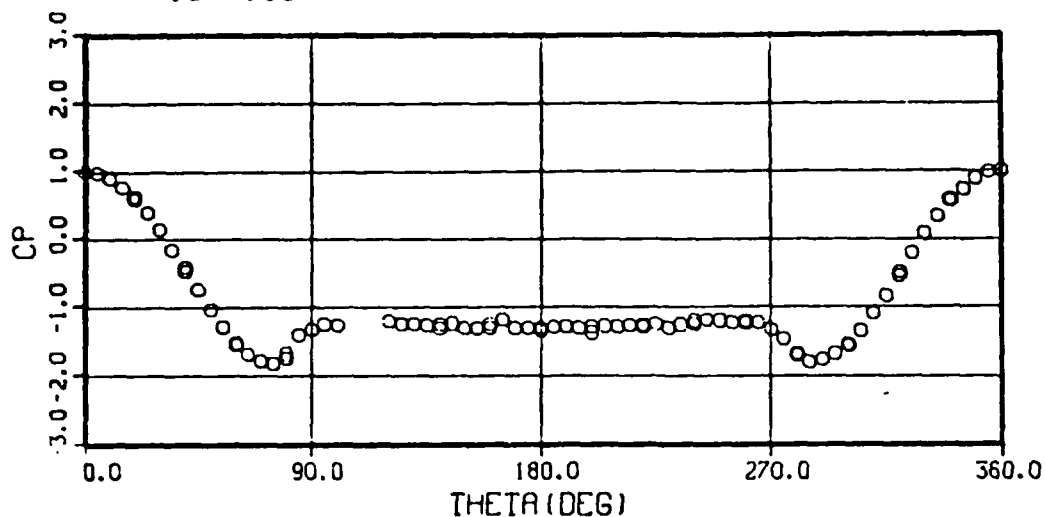
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 144 OIU- 25.2 +/- .00 RNDIU- .619 +/- .001

PIU- 917. +/- 3.20 VIU-223.31 +/- .438

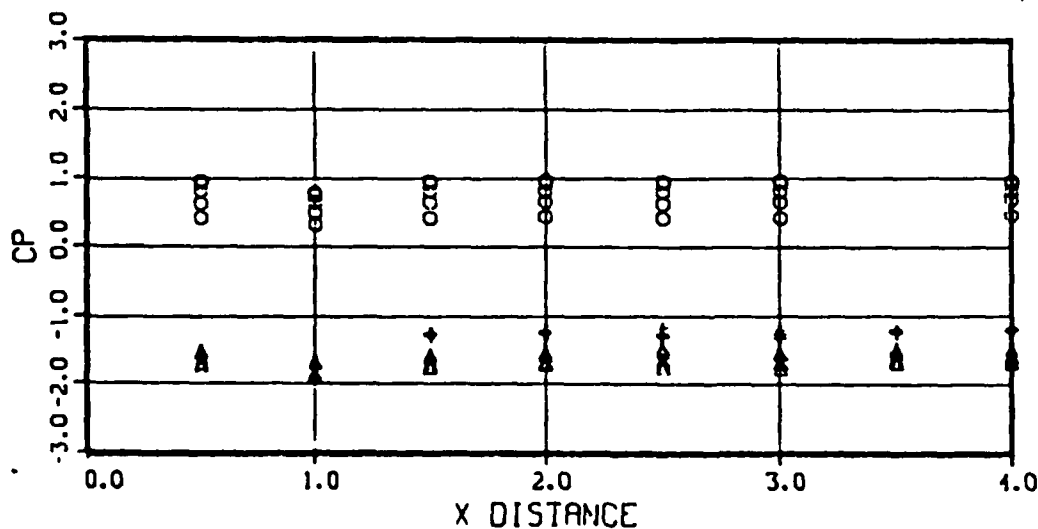
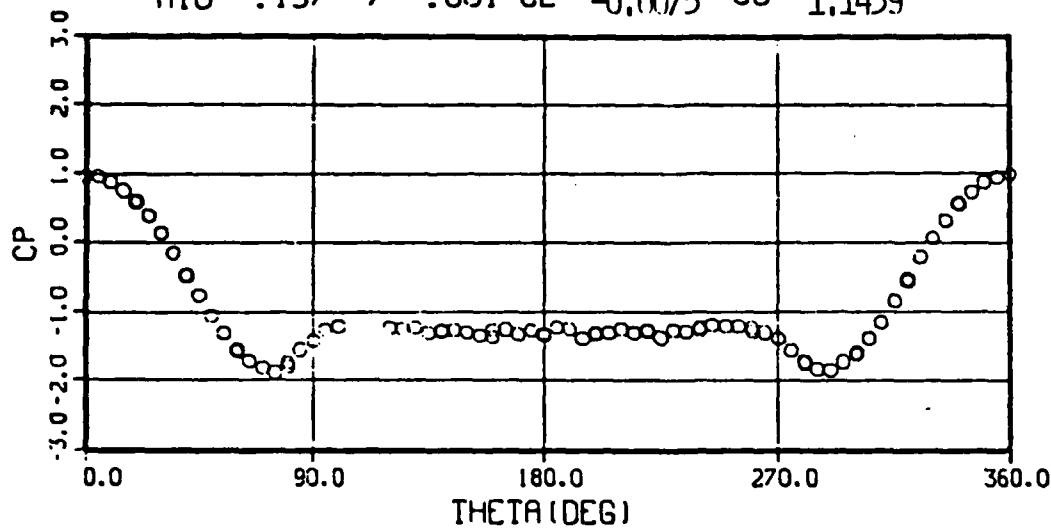
MIU- .198 +/- .001 CL- -0.00078 CD-1.1541



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 143 CIU- 20.8 +/- .00 RNDIU- .514 +/- .002
 PIU- 762. +/- 4.60 VIU-221.96 +/- .648
 MIU- .197 +/- .001 CL- -0.0075 CD- 1.1439



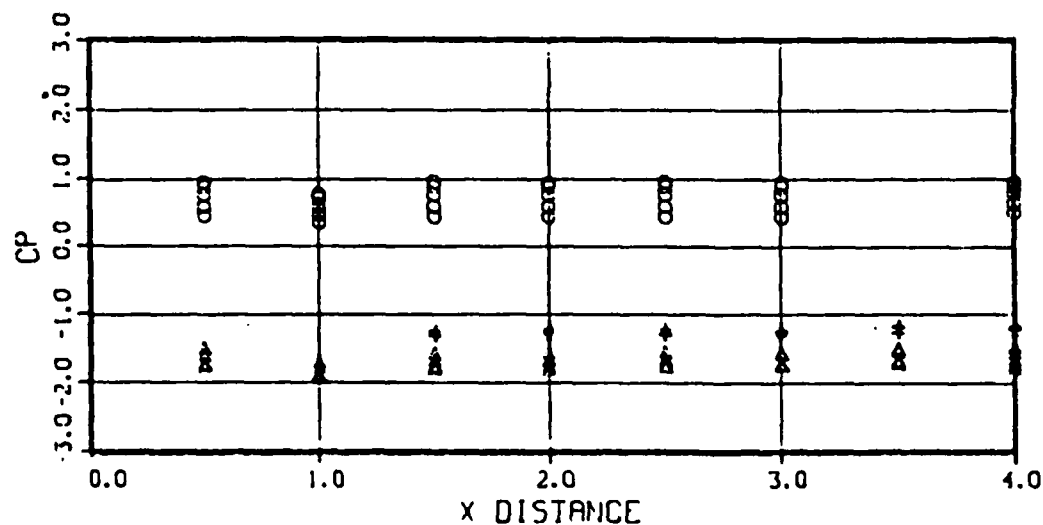
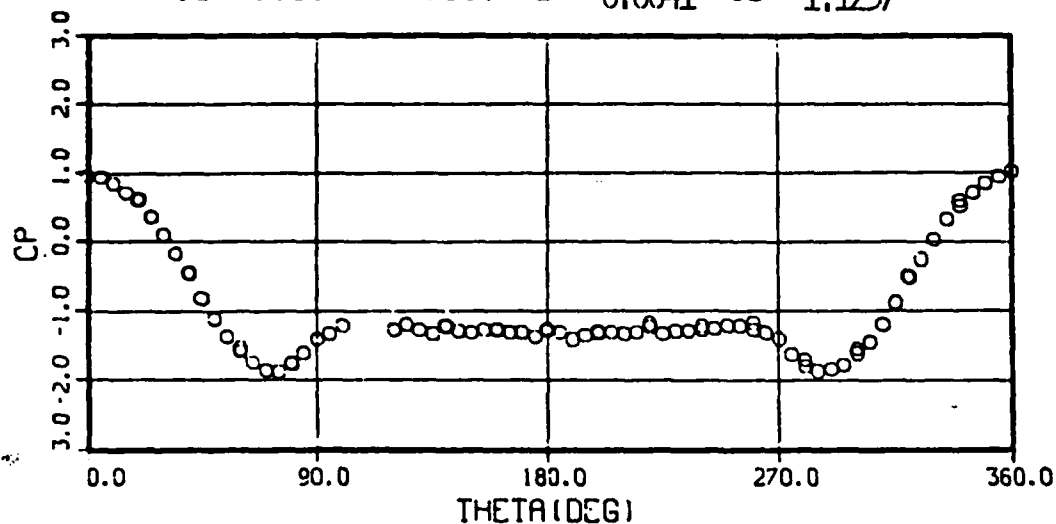
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 6 MESH SCREEN

RUN 142 OIU- 16.5 +/- .40 RI:DIU- .415 +/- .006

PIU- 612. +/- 15.60 VIU-219.46 +/- .600

MIU- .196 +/- .001 CL- -0.0041 CD- 1.1237



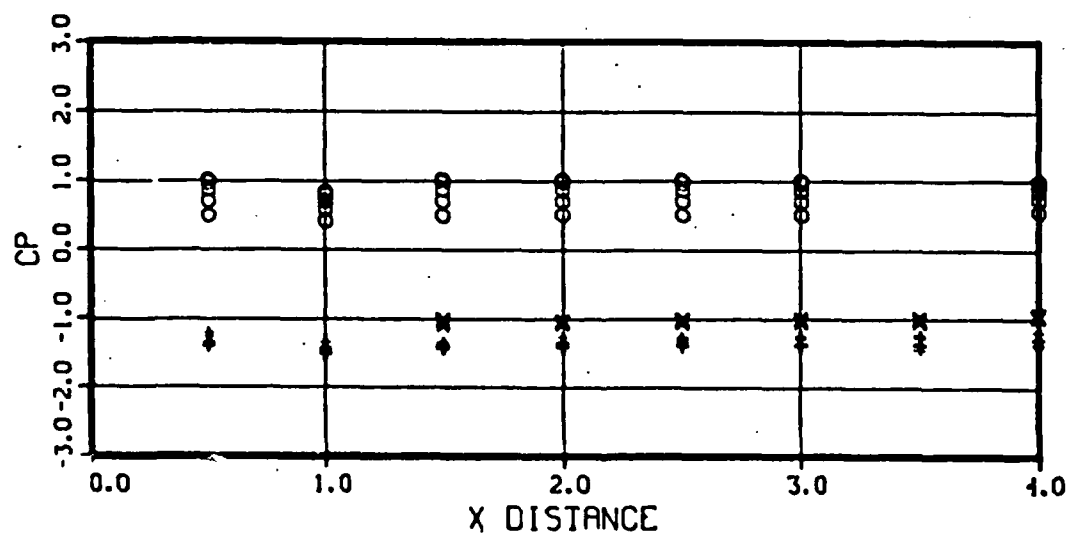
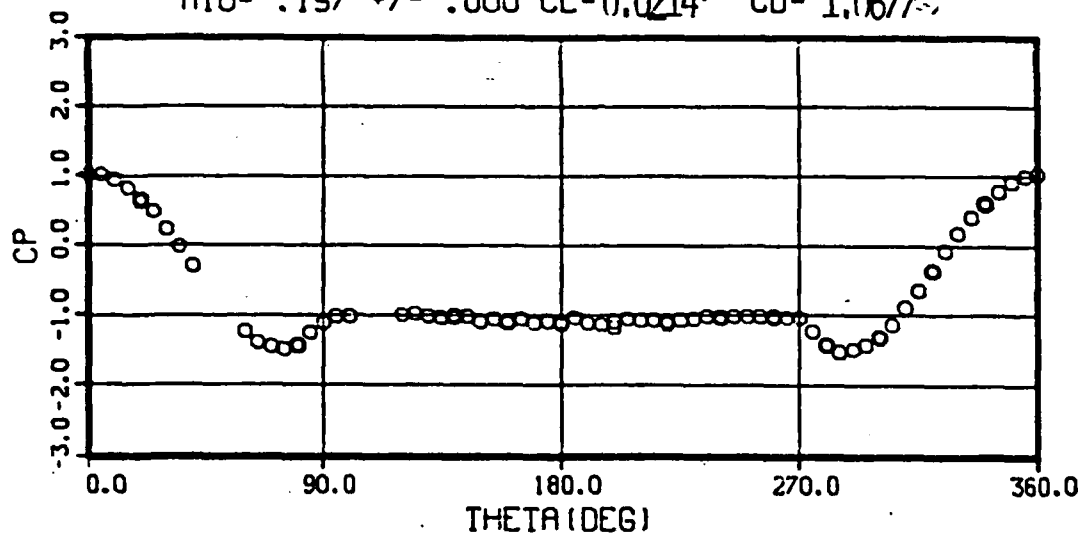
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 140 OIU- 51.8 +/- .00 RNDIU-1.287 +/- .001

PIU- 1904. +/- 5.20 VIU-221.34 +/- .222

MIU- .197 +/- .000 CL-0.0214 CD- 1.0677



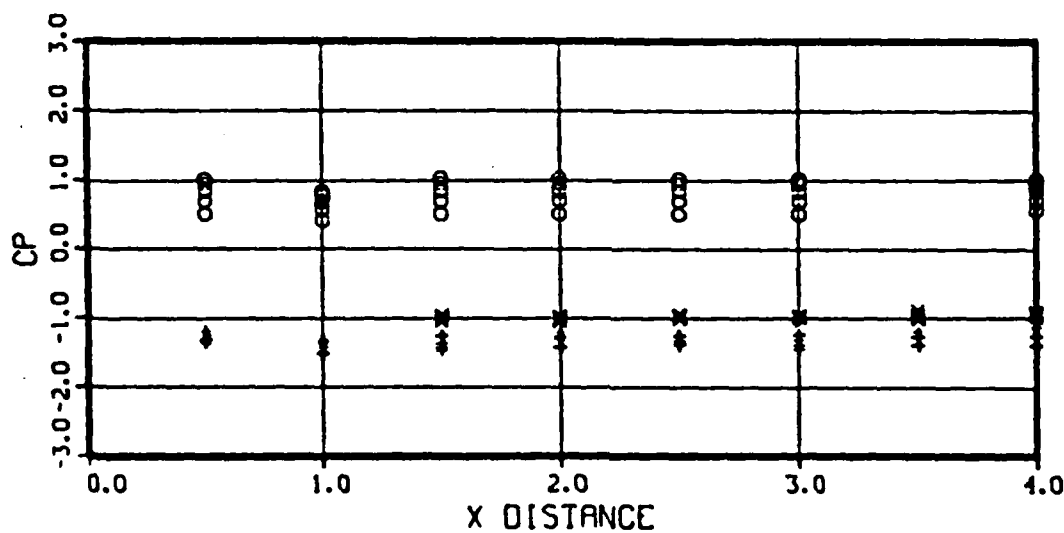
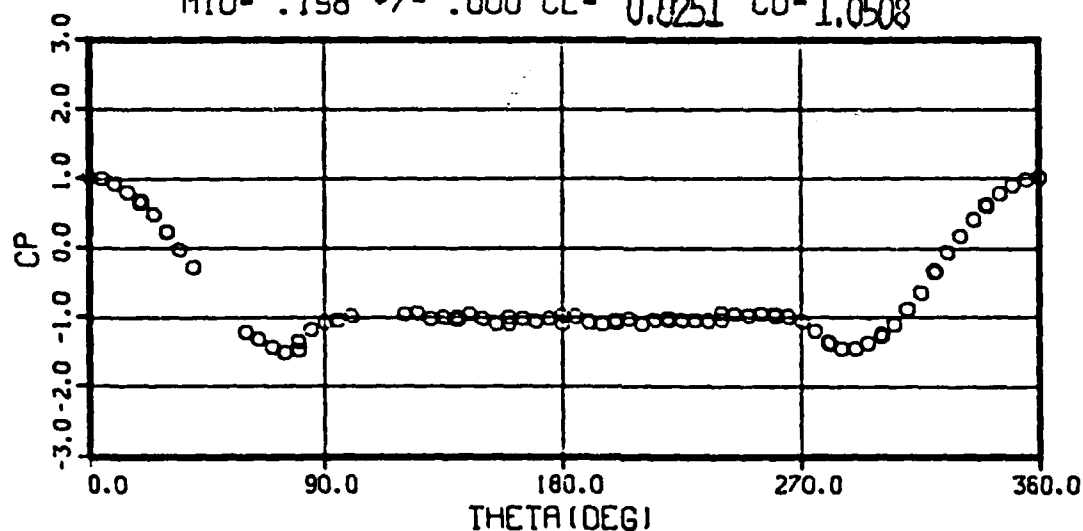
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 139 OIU- 61.3 +/- .18 RNDIU-1.537 +/- .004

PIU- 2231. +/- .60 VIU-221.38 +/- .688

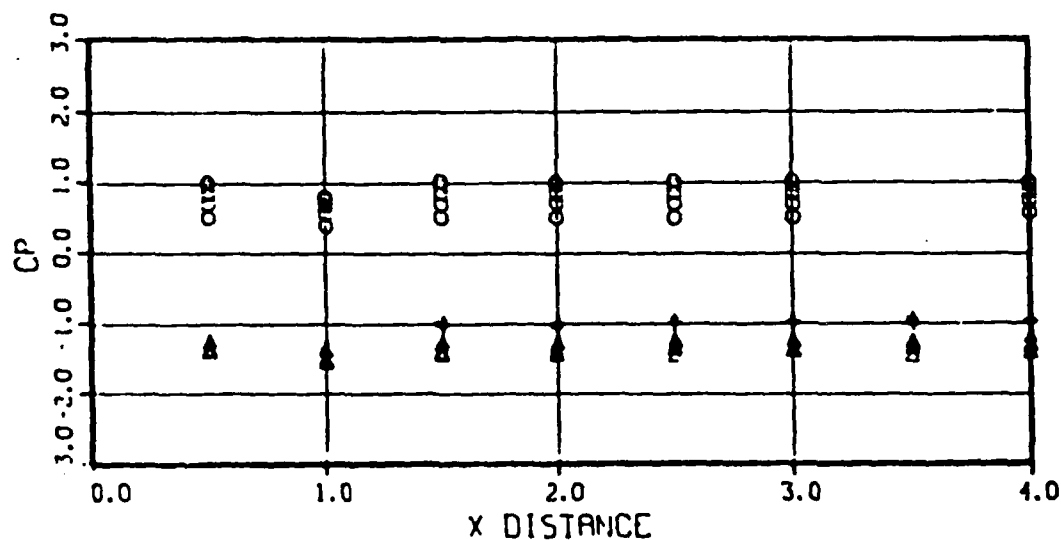
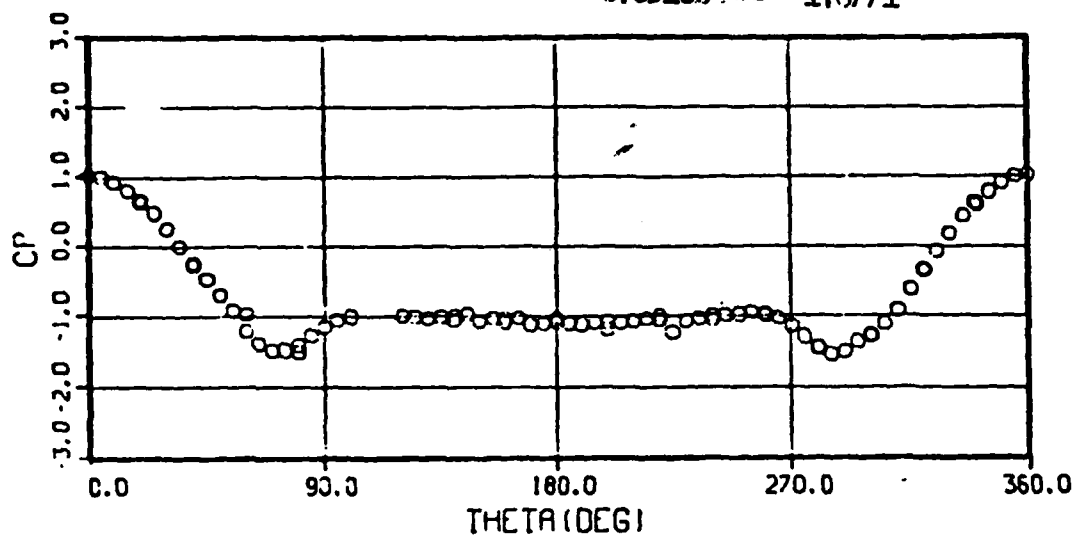
MIU- .198 +/- .000 CL= 0.0251 CD-1.0508



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER • NO. 6 MESH SCREEN

RUN 137 OIU- 86.4 +/- .30 RNDIU-2.064 +/- .004
 PIU- 3000. +/- 1.60 VIU-228.72 +/- .422
 MIU- .203 +/- .001 CL- 0.03186 CD- 1.0771



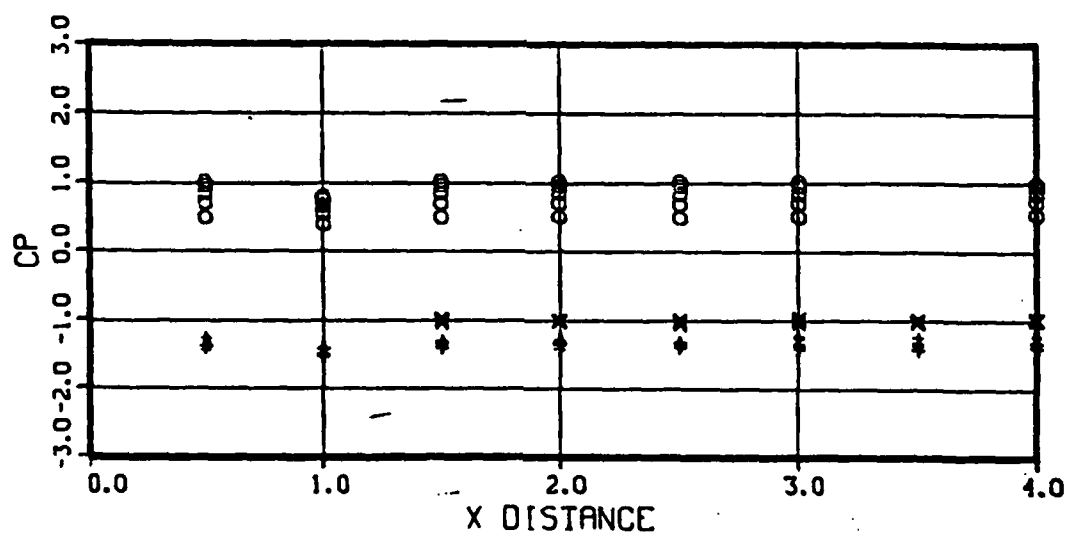
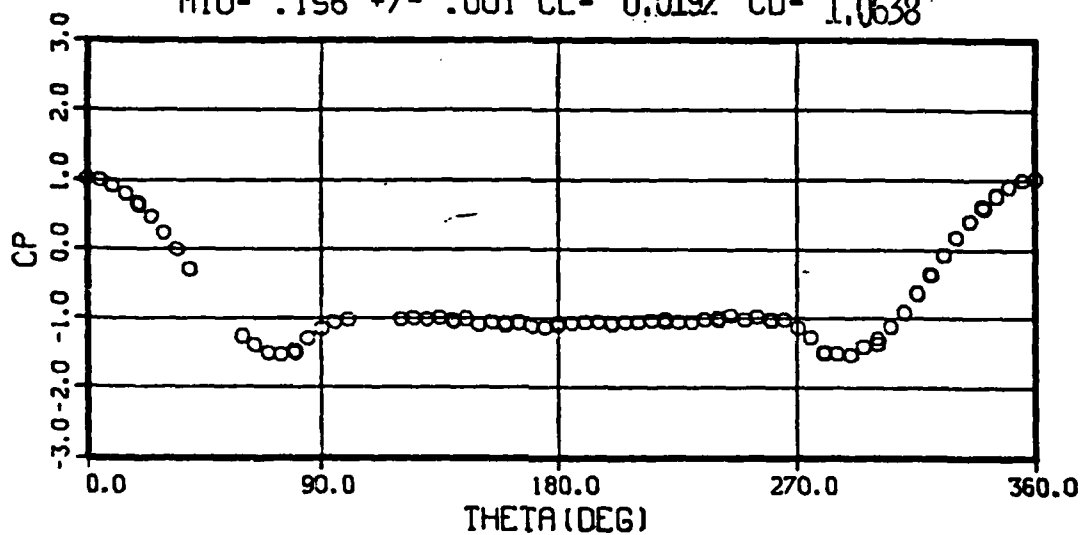
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 136 OIU-103.2 +/- .94 RNDIU-2.537 +/- .013

PIU- 3816. +/- 2.20 VIU-221.87 +/- .970

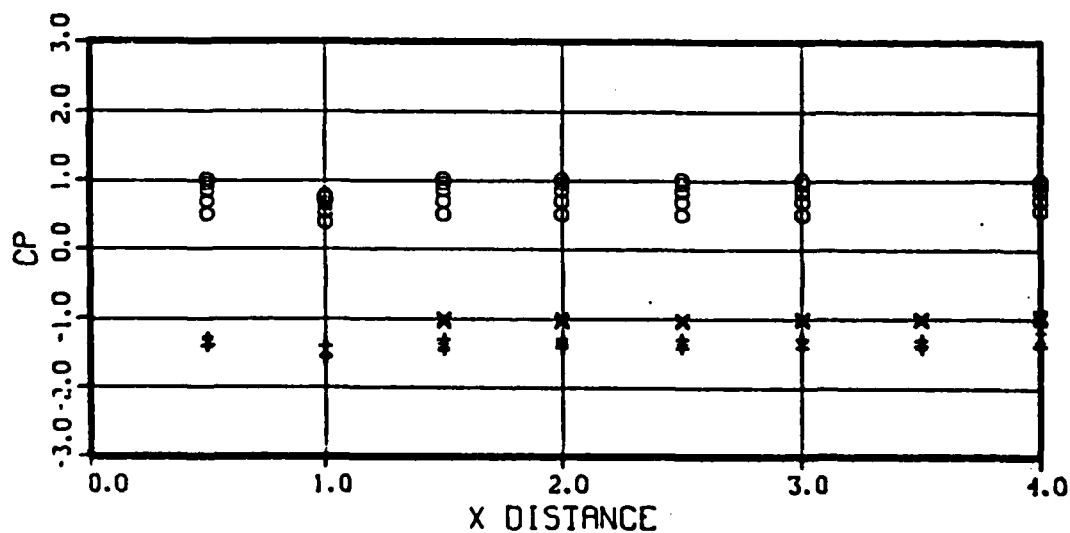
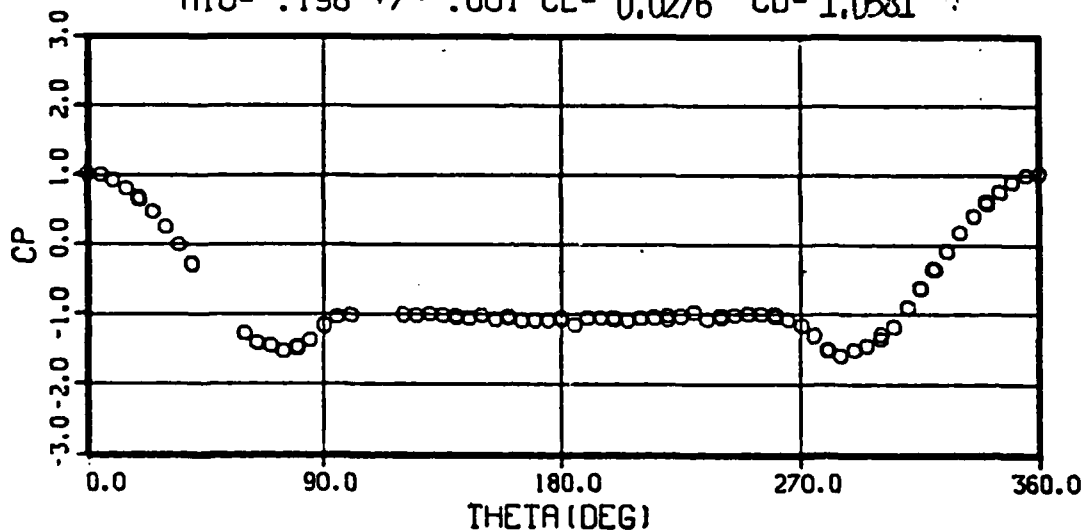
MIU- .196 +/- .001 CL- 0.0192 CD- 1.0638



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 135 OIU-125.1 +/- 1.44 RNDIU-3.049 +/- .014
 PIU- 4573. +/- 2.00 VIU-223.44 +/- 1.374
 MIU- .198 +/- .001 CL- 0.0276 CD- 1.0581



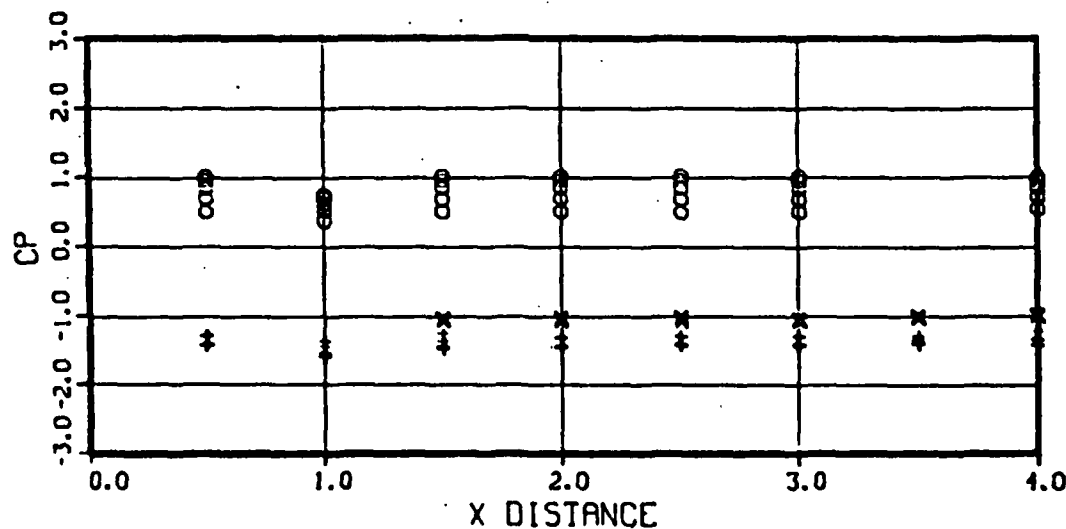
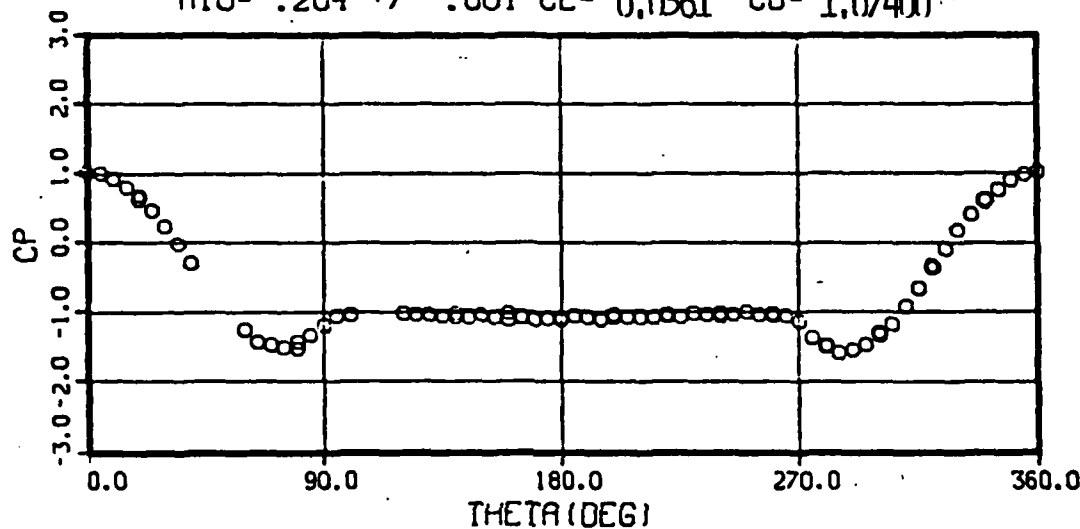
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 134 OIU-178.0 +/- 1.18 RNDIU-4.185 +/- .011

PIU- 6139. +/- 5.60 VIU-230.68 +/- .830

MIU- .204 +/- .001 CL- 0.0361 CD- 1.07400



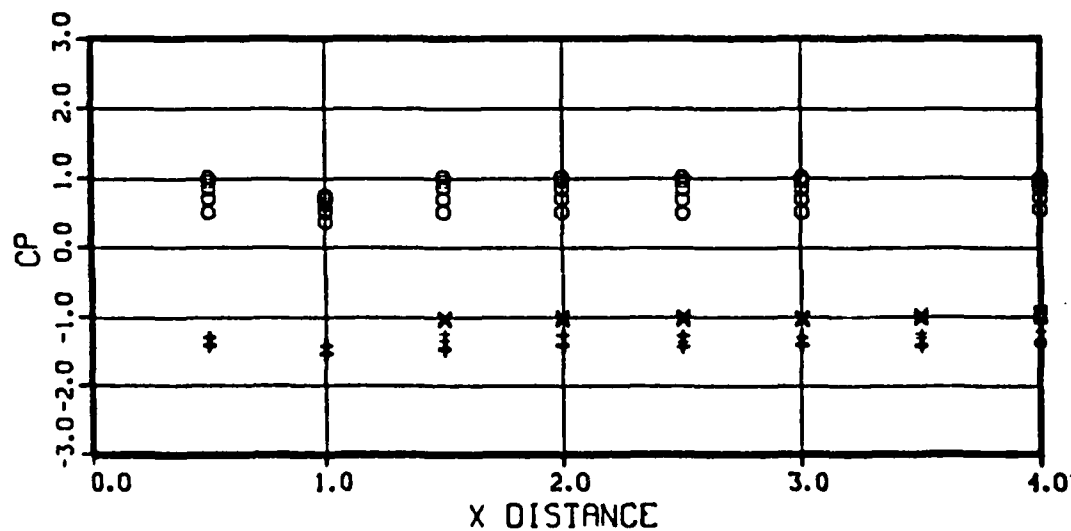
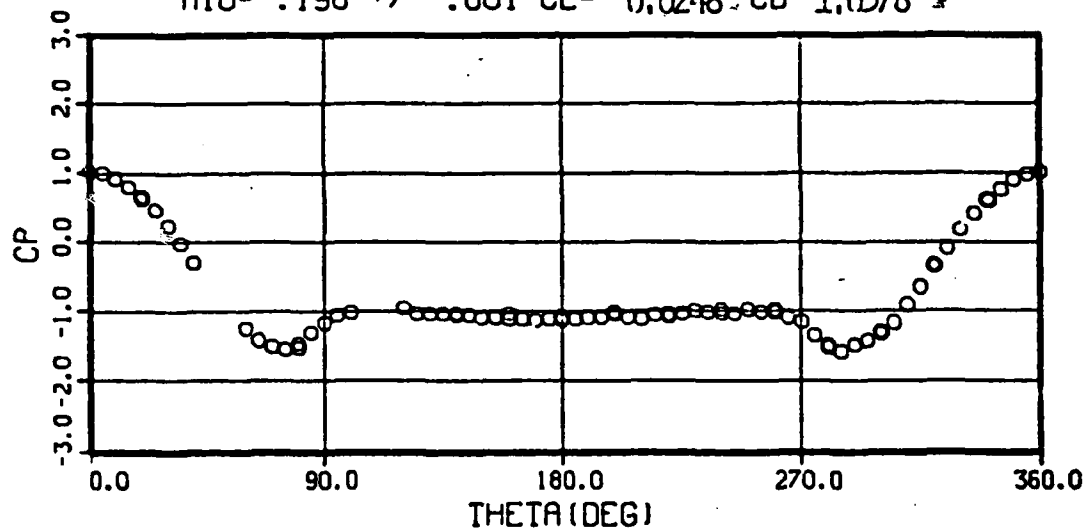
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 133 OIU-212.6 +/- 1.74 RNDIU-5.105 +/- .024

PIU- 7751. +/- 3.60 VIU-224.99 +/- .898

MIU- .198 +/- .001 CL- 0.0248 CD-1.0378



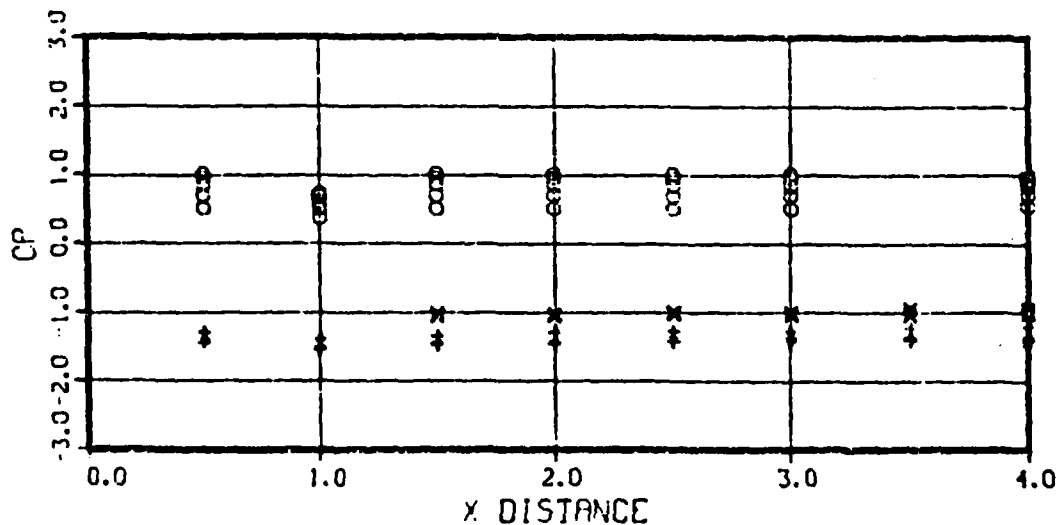
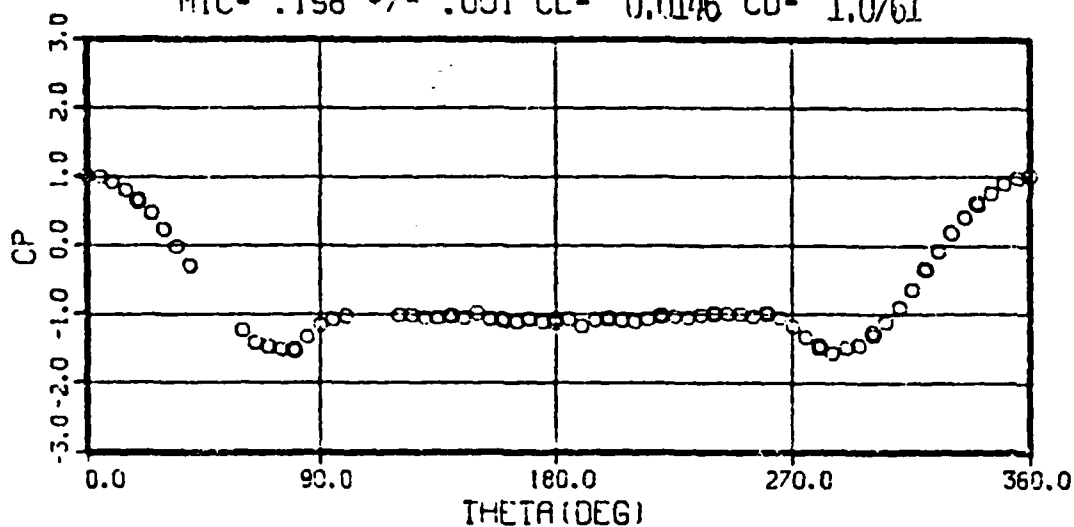
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 132 OIU-276.9 +/- 1.46 RNDIU-6.590 +/- .023

PIU-10068. +/- 2.00 VIU-225.97 +/- .532

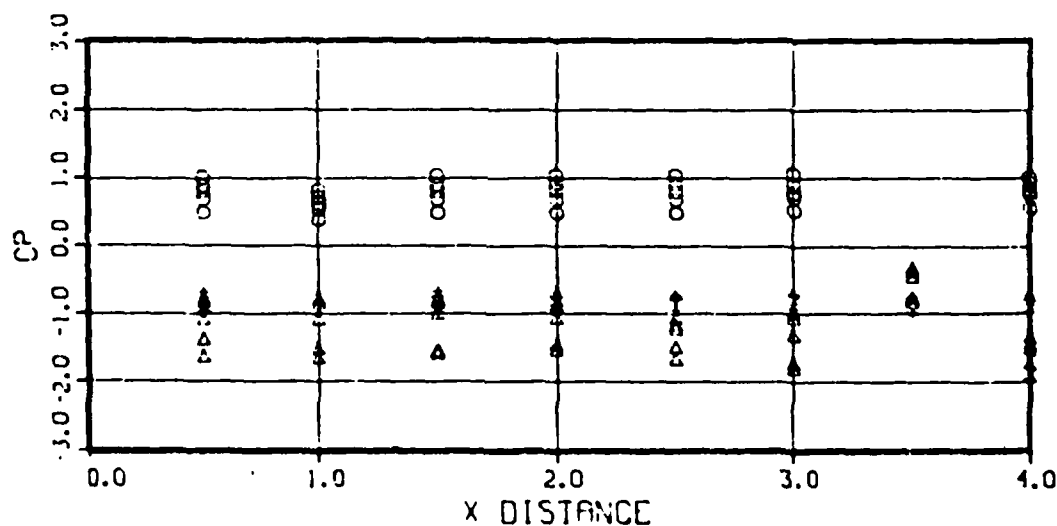
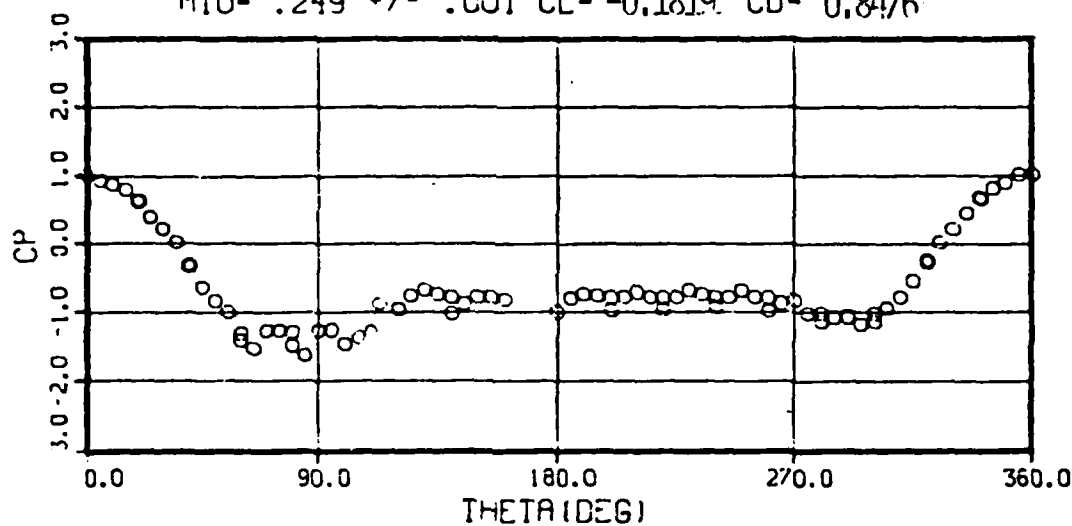
MIC- .198 +/- .001 CL- 0.0146 CD- 1.0761



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

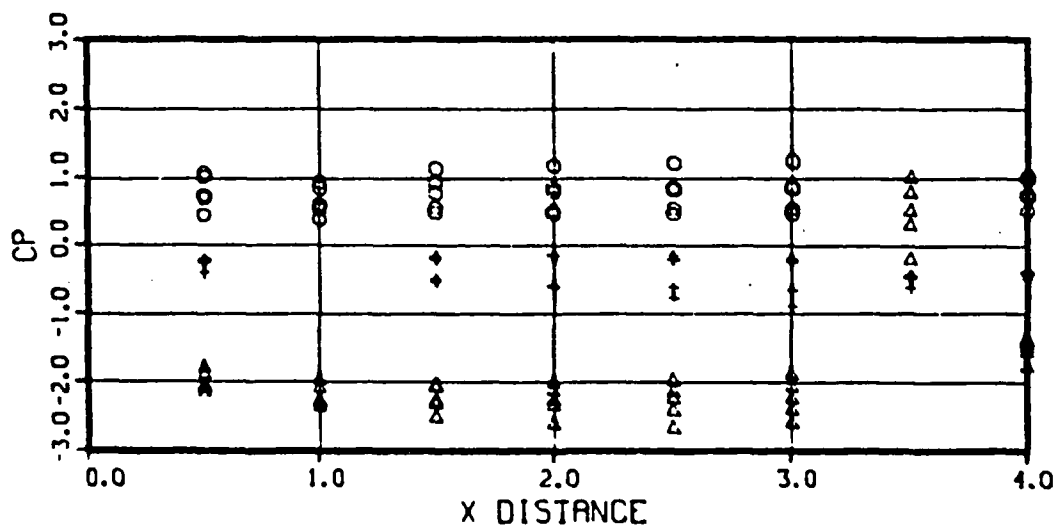
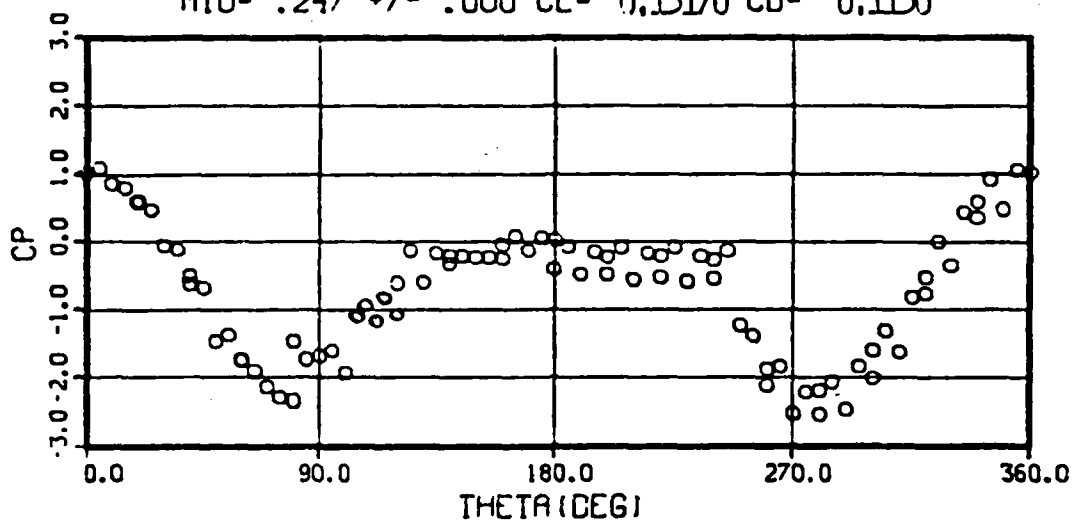
RUN 108 OIU- 21.2 +/- .16 RNDIU- .412 +/- .003
 PIU- 490. +/- 4.60 VIU-281.14 +/- .620
 MIU- .249 +/- .001 CL- -0.1819 CD- 0.8476



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

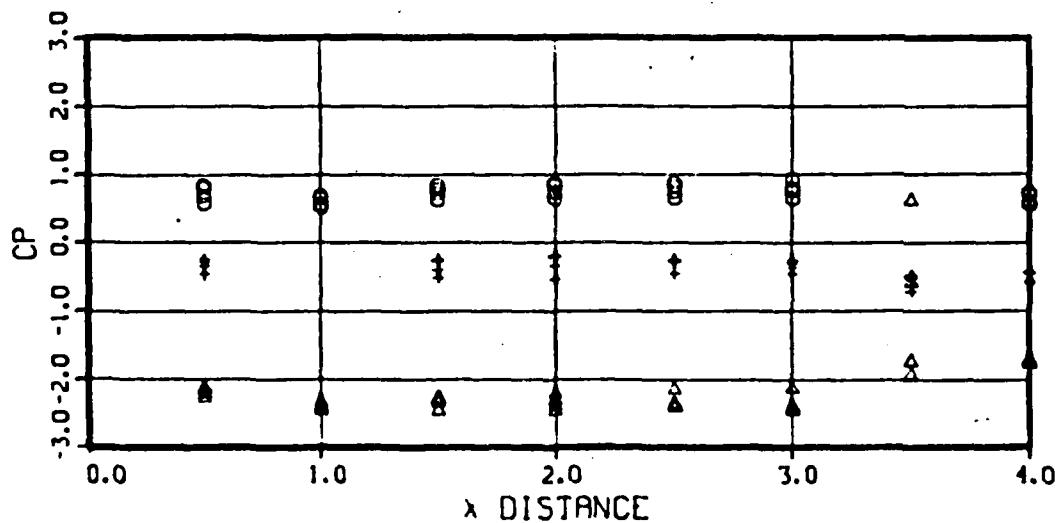
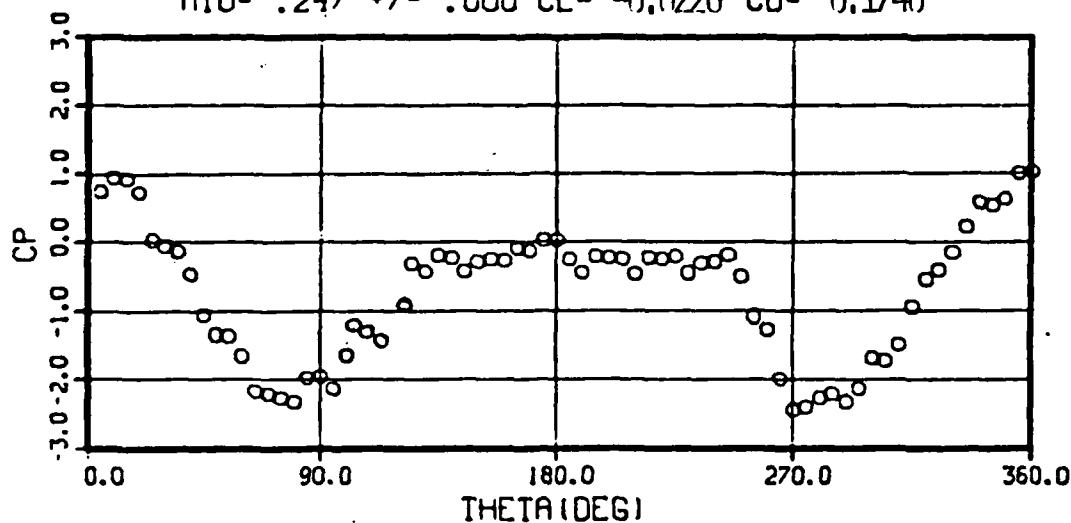
RUN 106 OIU- 26.4 +/- .12 RNDIU- .515 +/- .001
 PIU- 617. +/- 1.20 VIU-279.41 +/- .608
 MIU- .247 +/- .000 CL- 0.13170 CD- 0.1130



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-X 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

SMOOTH CYLINDER

RUN 105 OIU- 31.7 +/- .08 RNDIU- .617 +/- .001
 PIU- 741. +/- 1.00 VIU-279.62 +/- .233
 MIU- .247 +/- .000 CL- -0.0226 CD- 0.1740



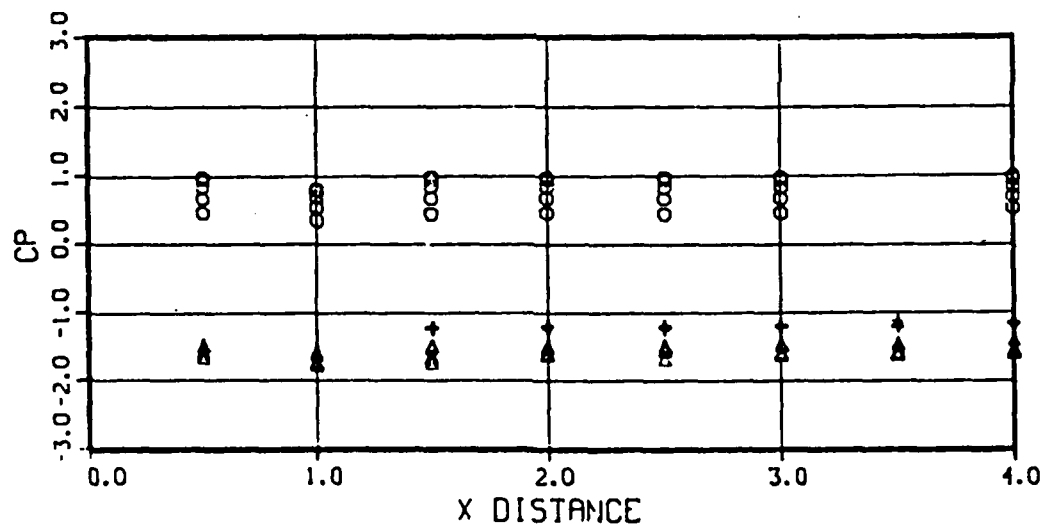
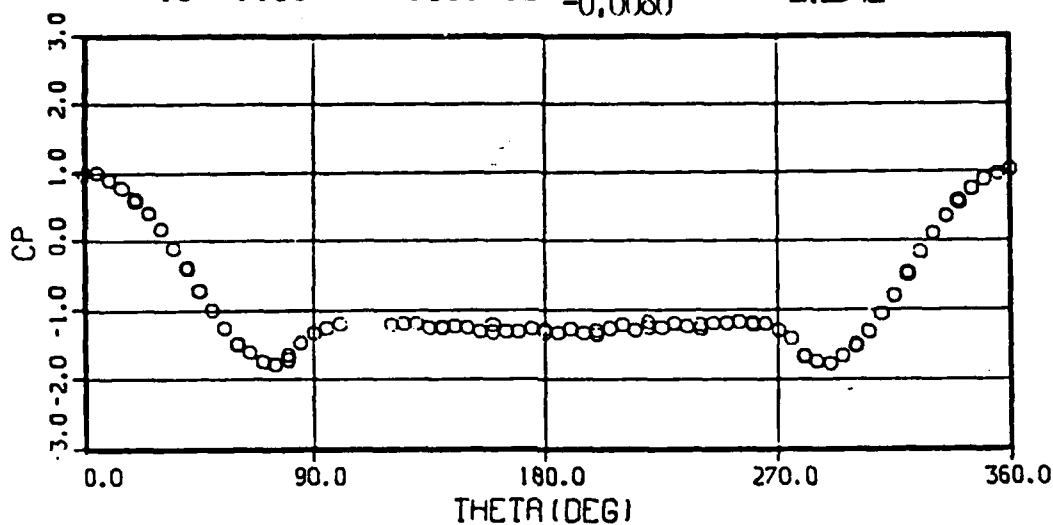
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 145 OIU- 29.9 +/- .00 RNDIU- .727 +/- .002.

PIU- 1081. +/- 4.00 VIU-224.11 +/- .404

MIU- .199 +/- .001 CL- -0.0080 CD- 1.1541



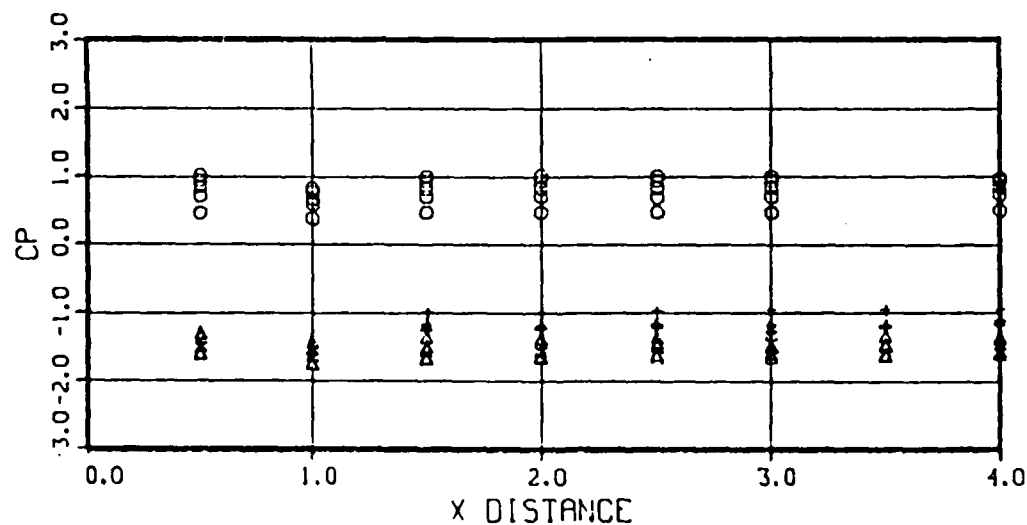
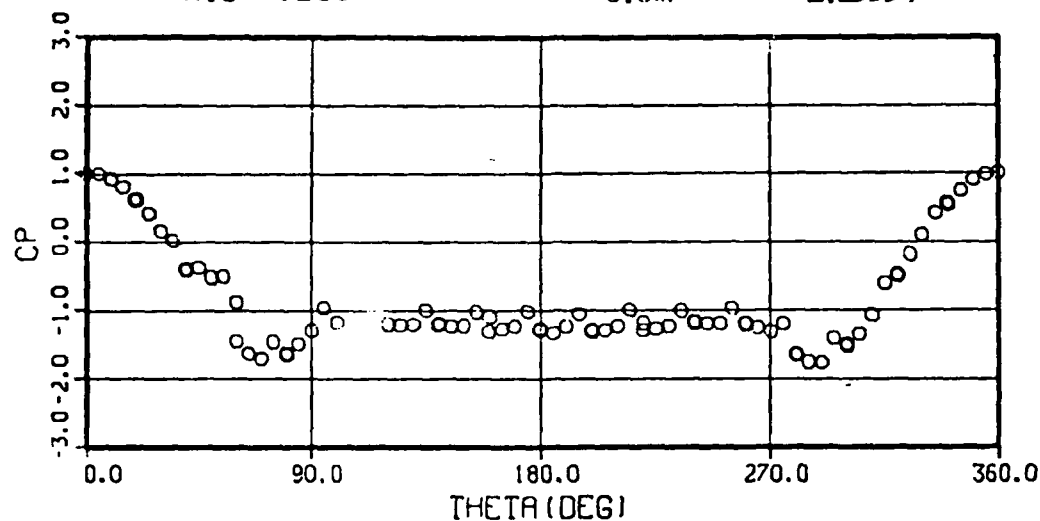
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 146 OIU- 34.4 +/- 3.16 RNDIU- .831 +/- .038

PIU- 1232. +/- 4.40 VIU-225.82 +/- 10.158

MIU- .200 +/- .009 CL-0.067 CO-1.15330



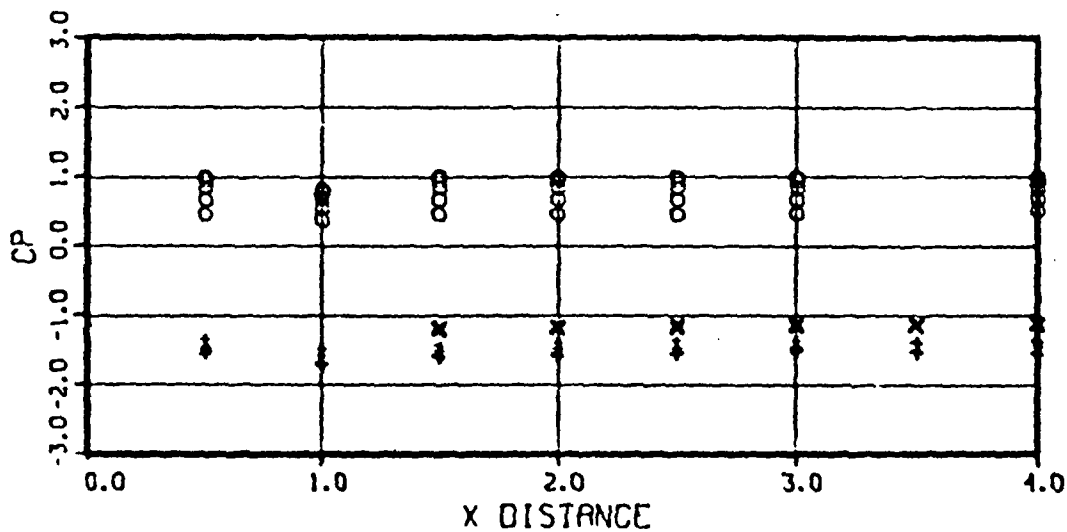
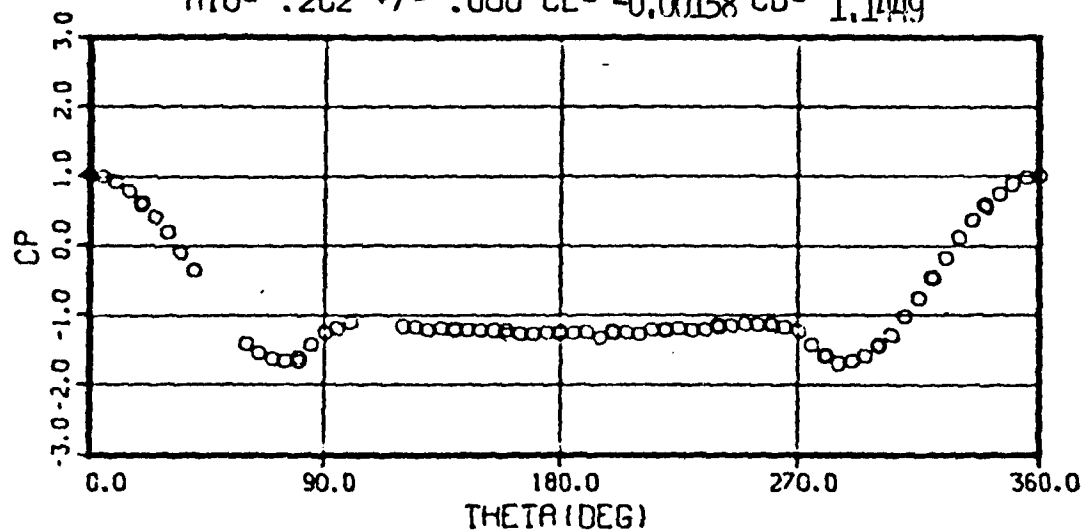
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 147 OIU- 39.8 +/- .10 RNDIU- .947 +/- .003

PIU- 1393. +/- 3.60 VIU-228.57 +/- .116

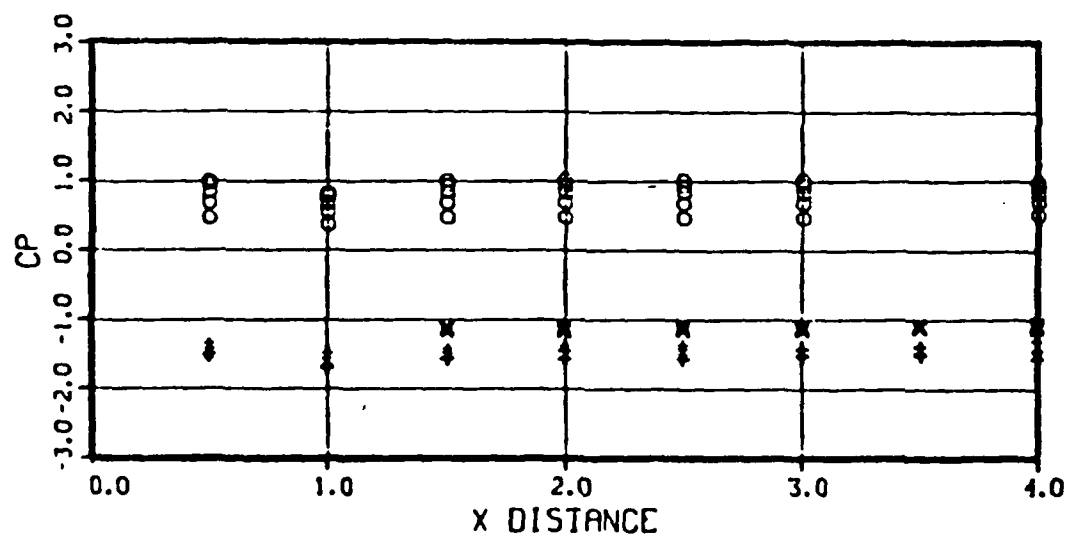
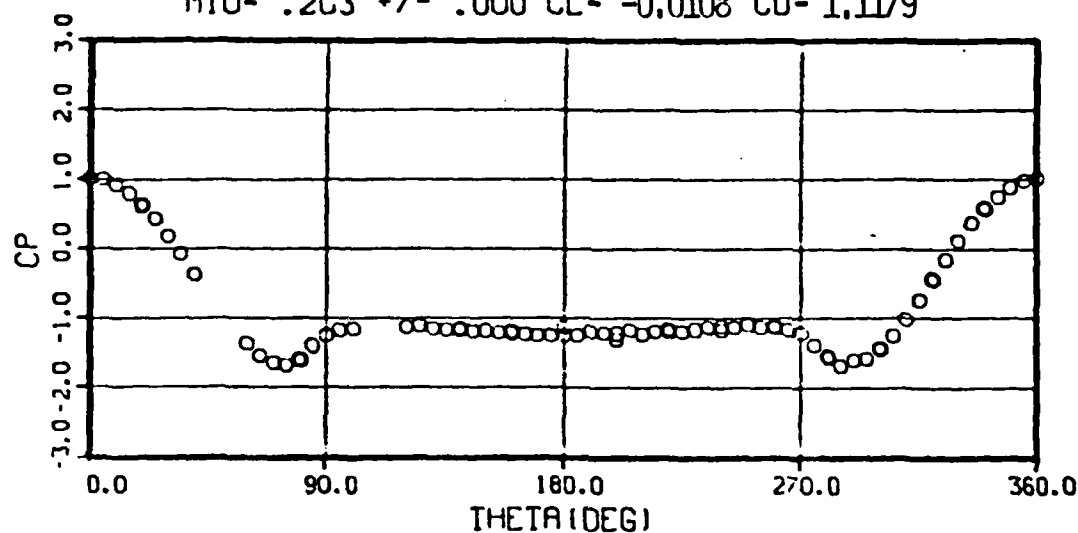
MIU- .202 +/- .000 CL- -0.00158 CD- 1.1449



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

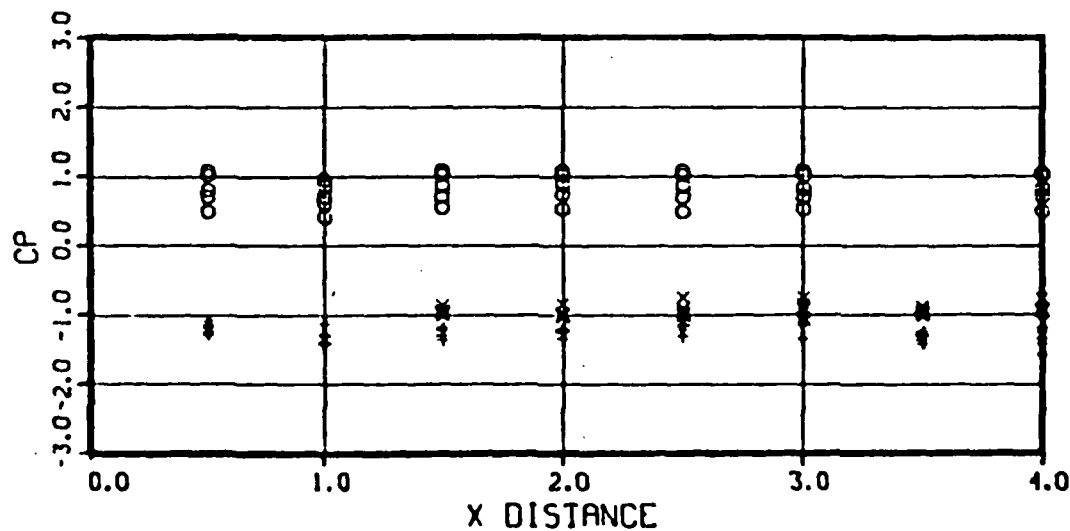
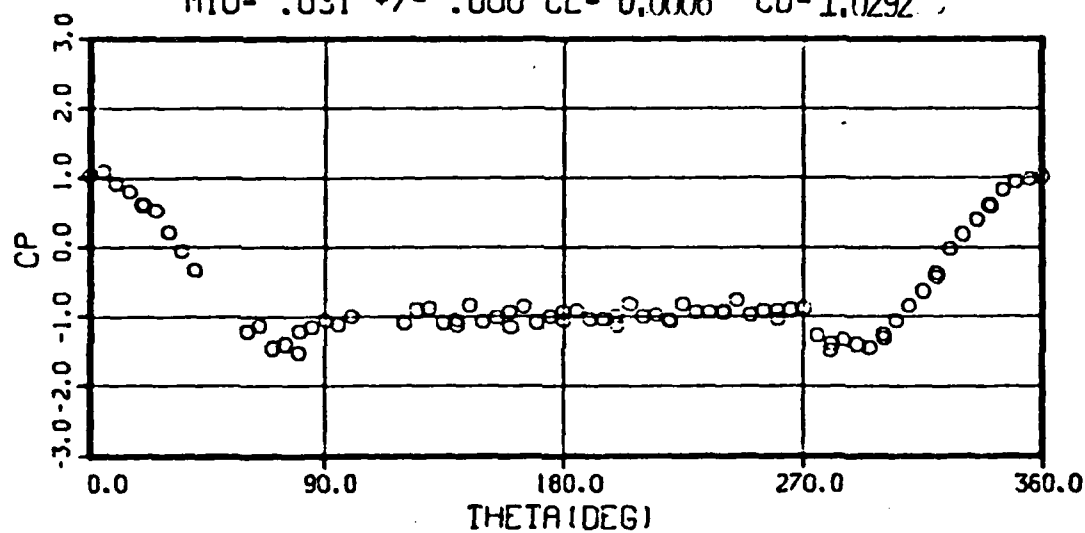
RUN 148 OIU- 44.8 +/- .00 RNDIU-1.057 +/- .001
 PIU- 1553. +/- 3.40 VIU-230.02 +/- .252
 MIU- .2C3 +/- .000 CL- -0.0108 CO- 1.1179



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

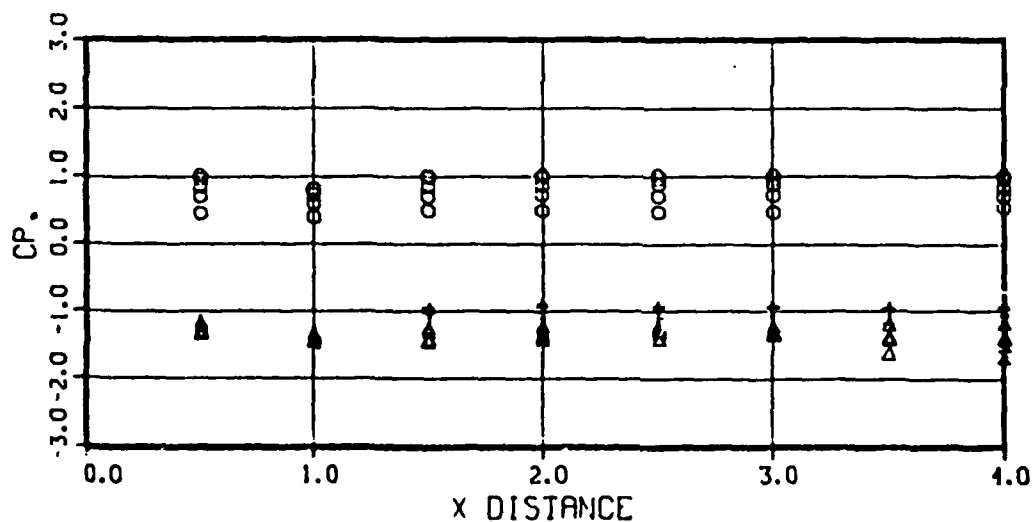
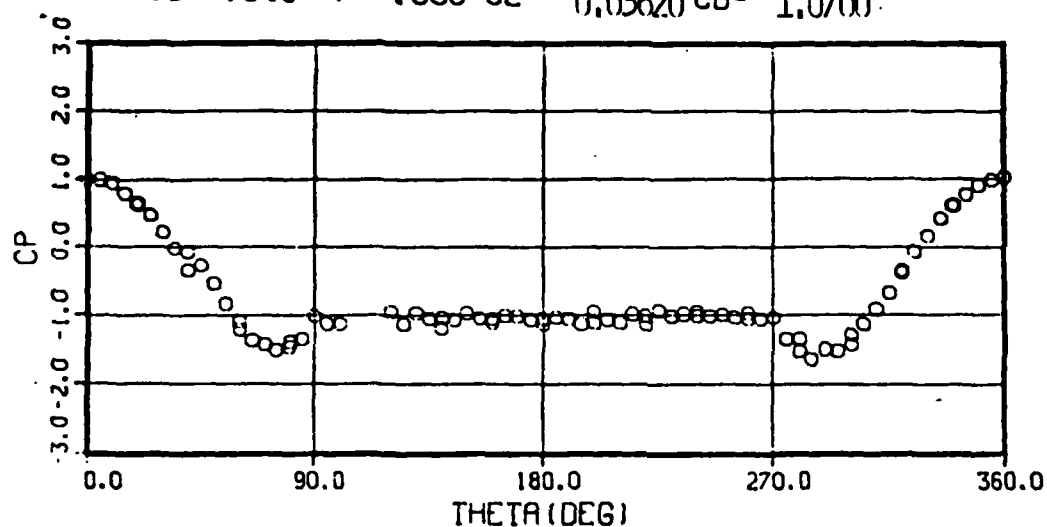
RUN 150 QIU- 7.0 +/- .00 RNDIU-1.092 +/- .002
 PIU-10321. +/- 1.40 VIU- 34.94 +/- .018
 MIU- .031 +/- .000 CL- 0.0006 CD-1.0292



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 151 OIU- 11.7 +/- .00 RNDIU-1.421 +/- .001
 PIU-10316. +/- .00 VIU- 45.24 +/- .016
 MIU- .040 +/- .000 CL- 0.03620 CD- 1.0700



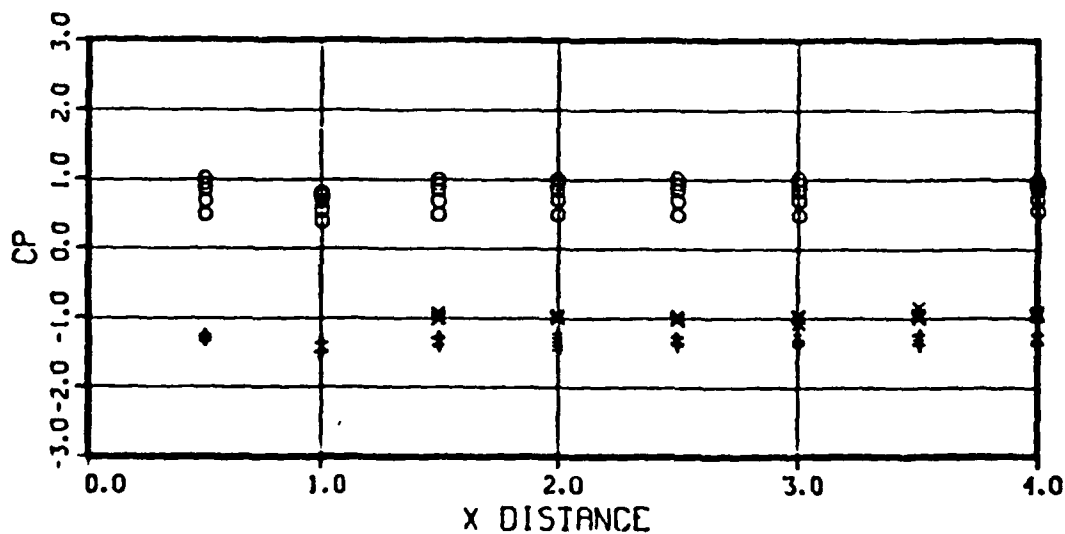
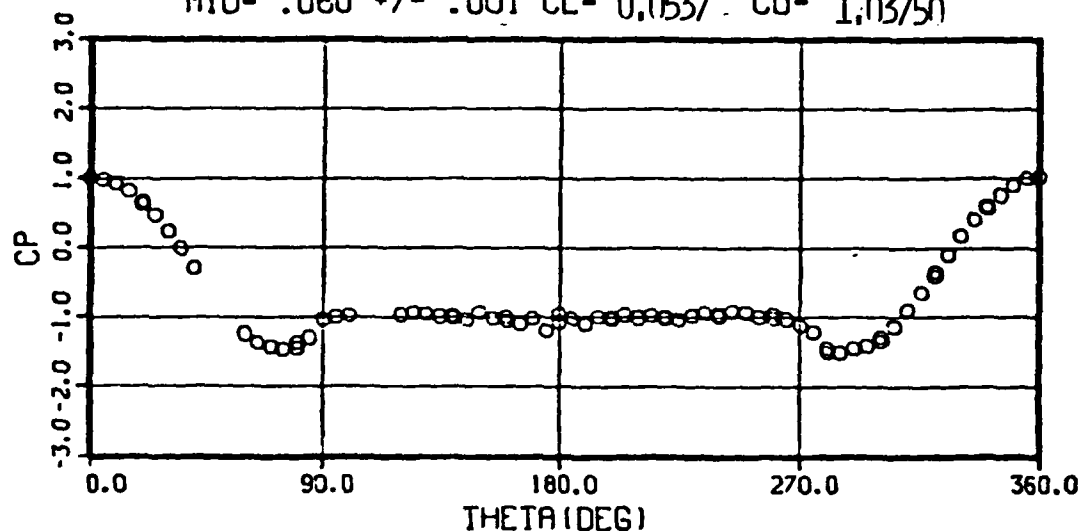
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 152 OIU- 26.1 +/- .28 RNDIU-2.127 +/- .013

PIU-10300. +/- 1.00 VIU- 67.56 +/- .434

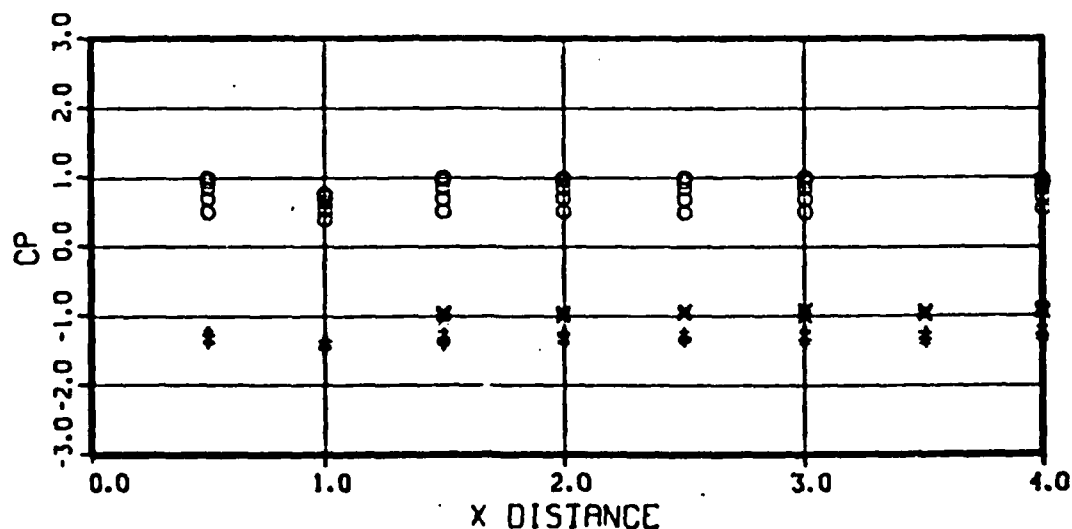
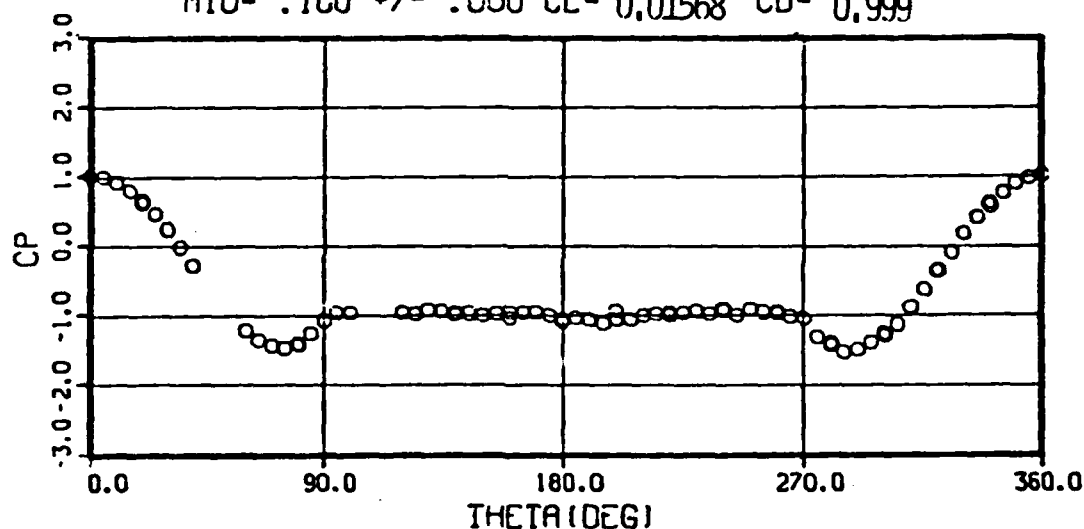
MIU- .060 +/- .001 CL- 0.0537 CO- 1.03750



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

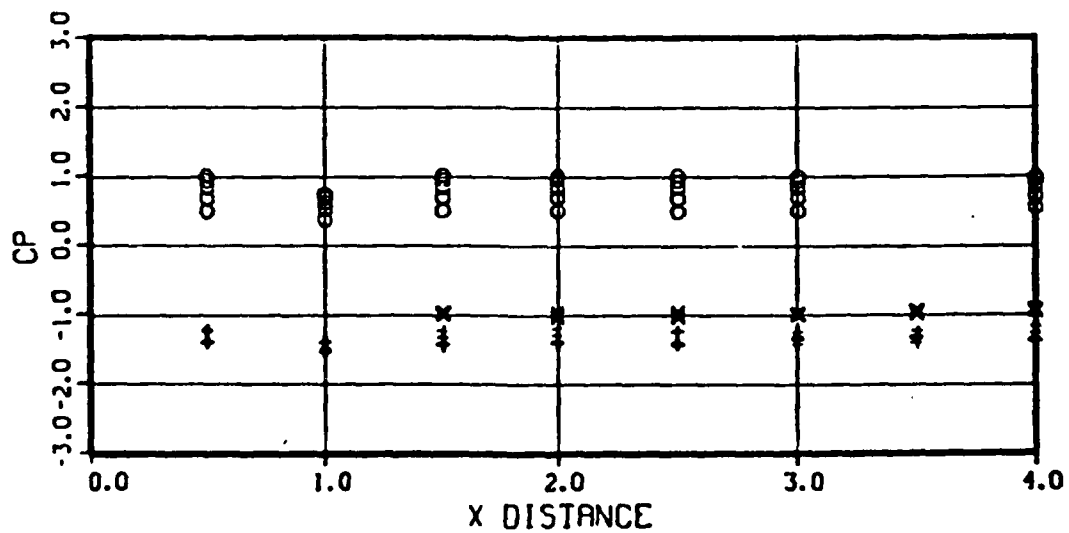
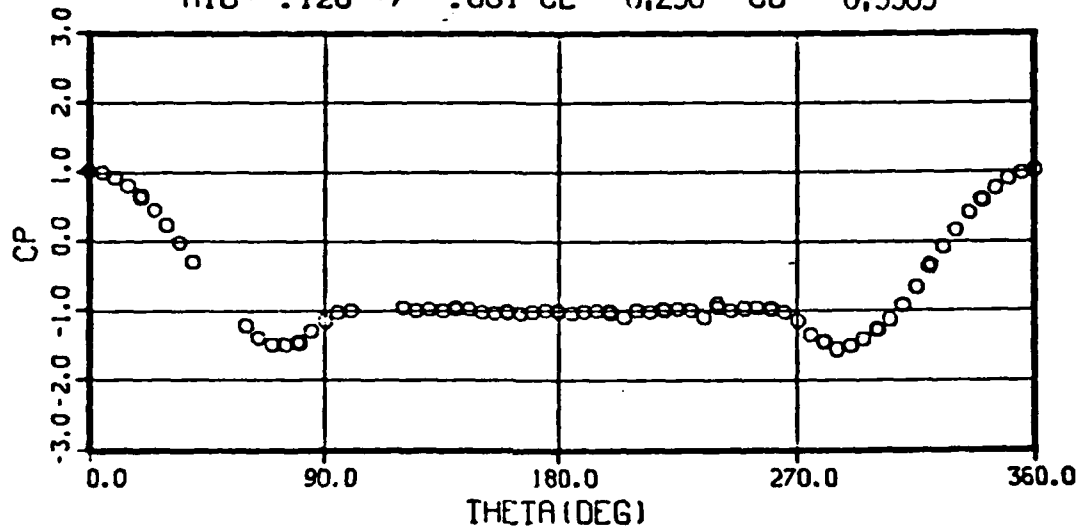
RUN 153 OIU- 71.5 +/- .22 RNDIU-3.515 +/- .007
 PIU-10254. +/- 2.00 VIU-112.01 +/- .186
 MIU- .100 +/- .000 CL- 0.01568 CD- 0.999



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 154 CIU-103.1 +/- .90 RNDIU-4.209 +/- .021
 PIU-10226. +/- 2.20 VIU-134.77 +/- .566
 MIU- .120 +/- .001 CL- -0.296 CD- 0.9909



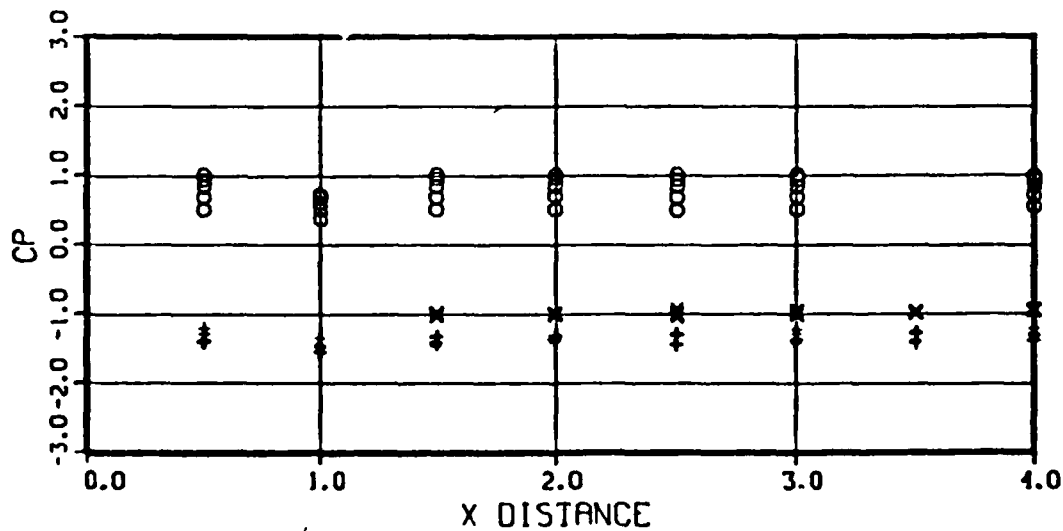
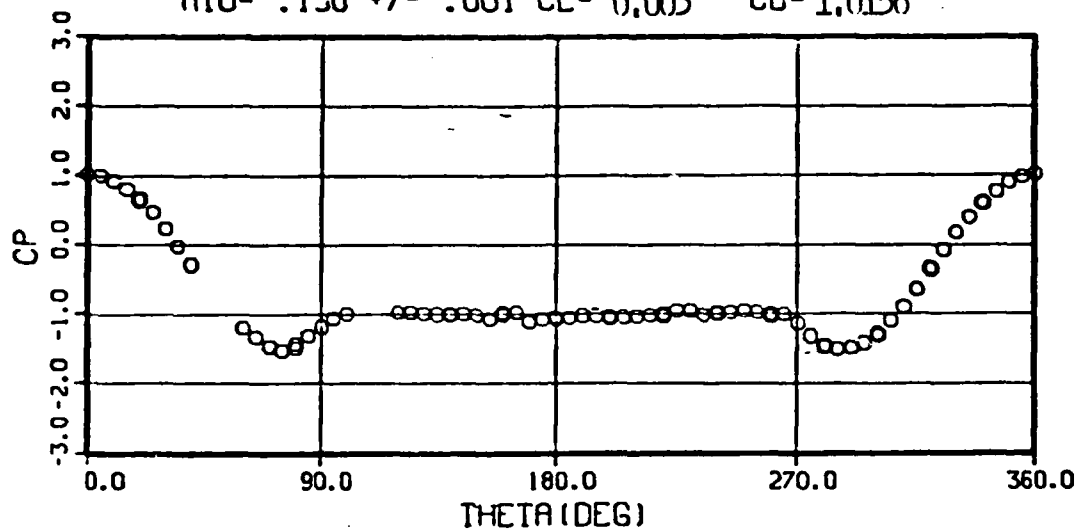
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 155 OIU-160.7 +/- .86 RNDIU-5.218 +/- .017

PIU-10164. +/- 1.60 VIU-169.06 +/- .416

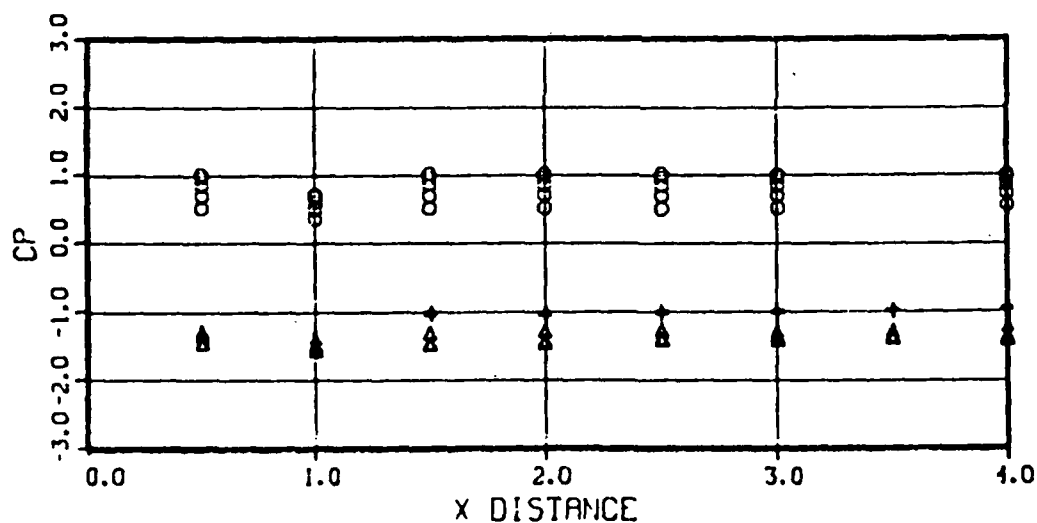
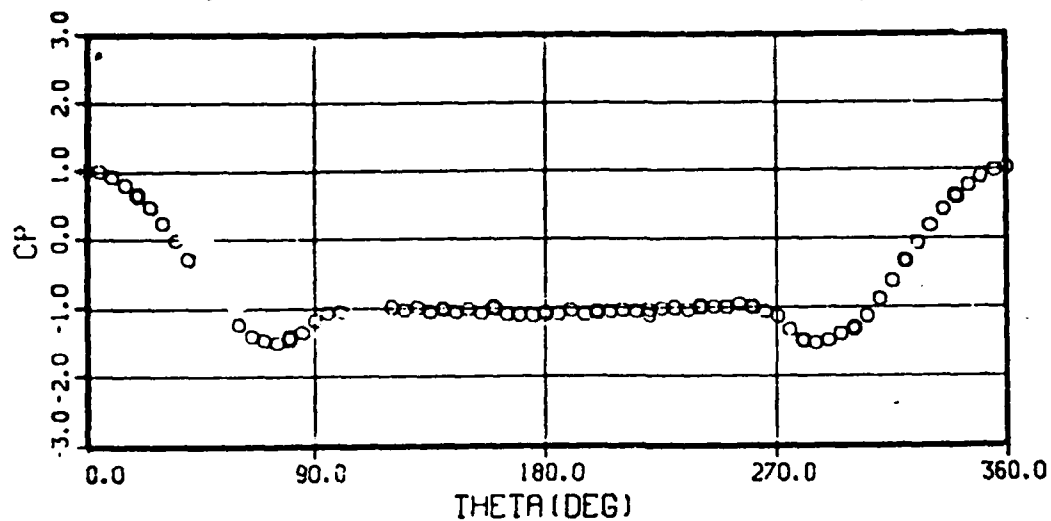
MIU- .150 +/- .001 CL- 0.003 CD-1.0156



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 156 OIU-227.4 +/- .84 RNDIU-6.136 +/- .021
 PIU-10093. +/- 6.20 VIU-202.39 +/- .298
 MIU- .179 +/- .001 CL- 0.0003 CD- 1.0474



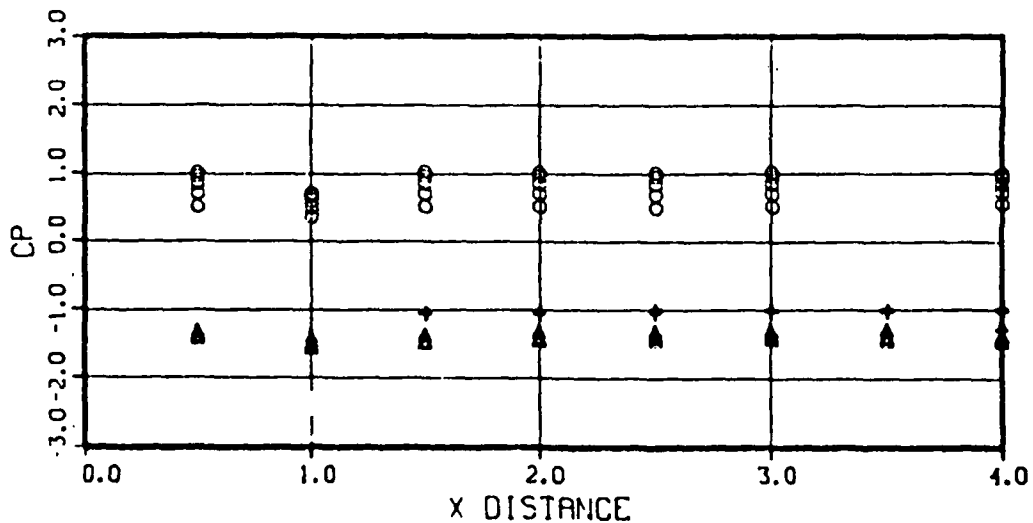
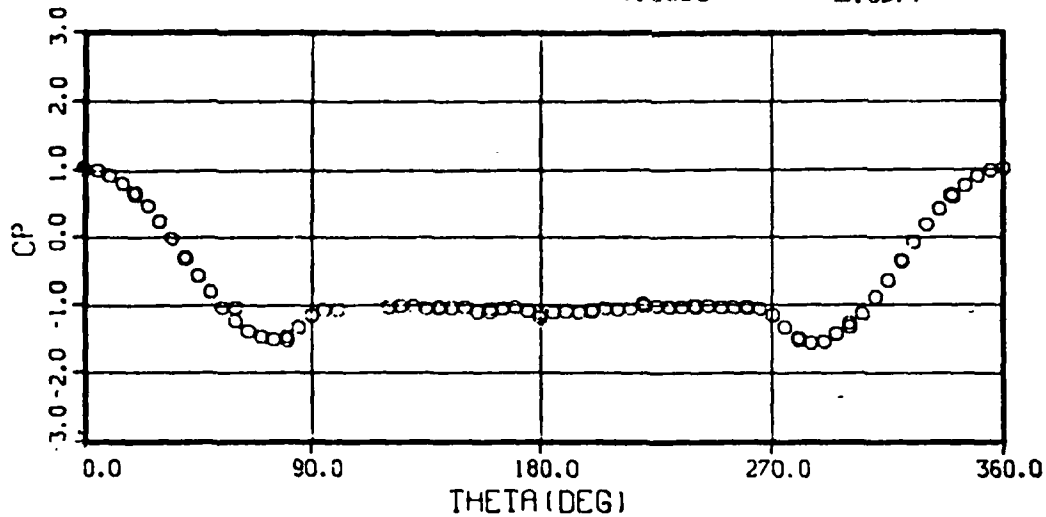
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 6 MESH SCREEN

RUN 157 OIU-281.3 +/- .48 RNDIU-6.710 +/- .014

PIU-10044. +/- 3.80 VIU-226.99 +/- .218

MIU- .200 +/- .000 CL- 0.0096 CD- 1.0579



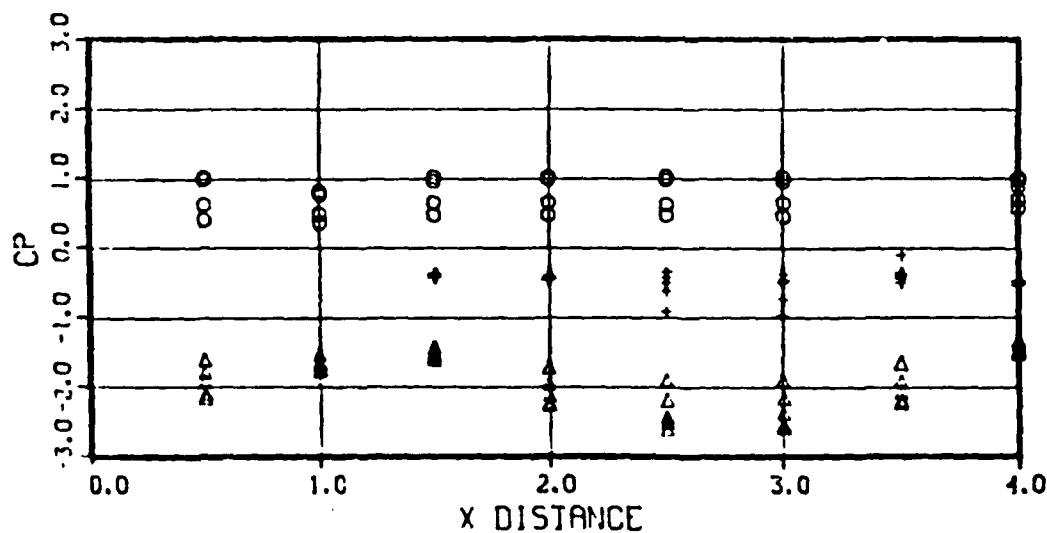
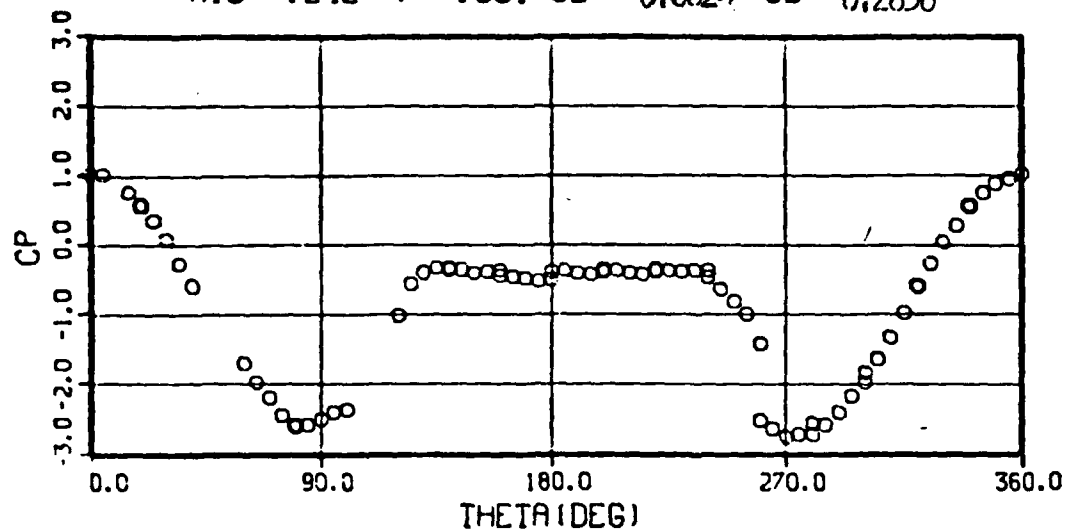
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 171 OIU- 19.7 +/- .08 RNDIU- .408 +/- .002

PIU- 478. +/- 3.80 VIU- 269.46 +/- .620

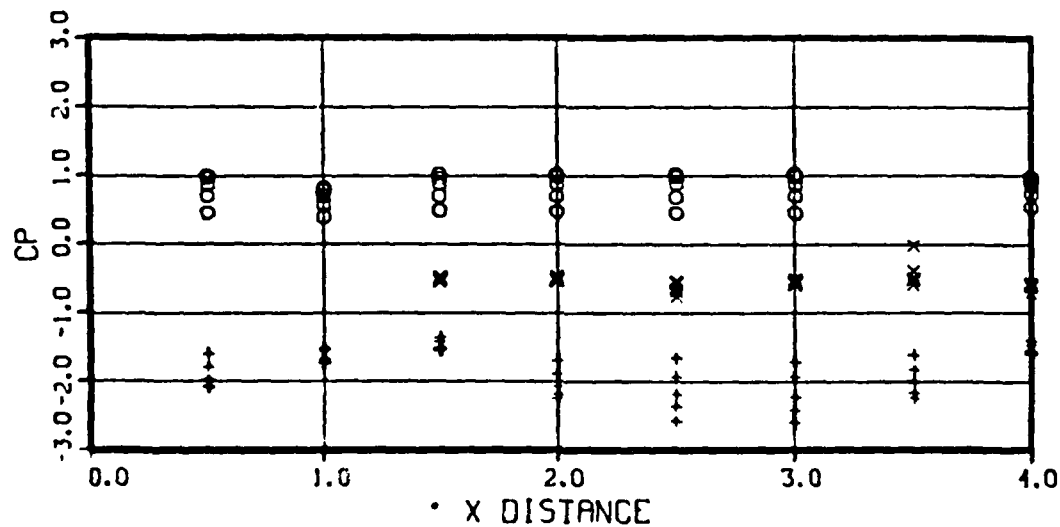
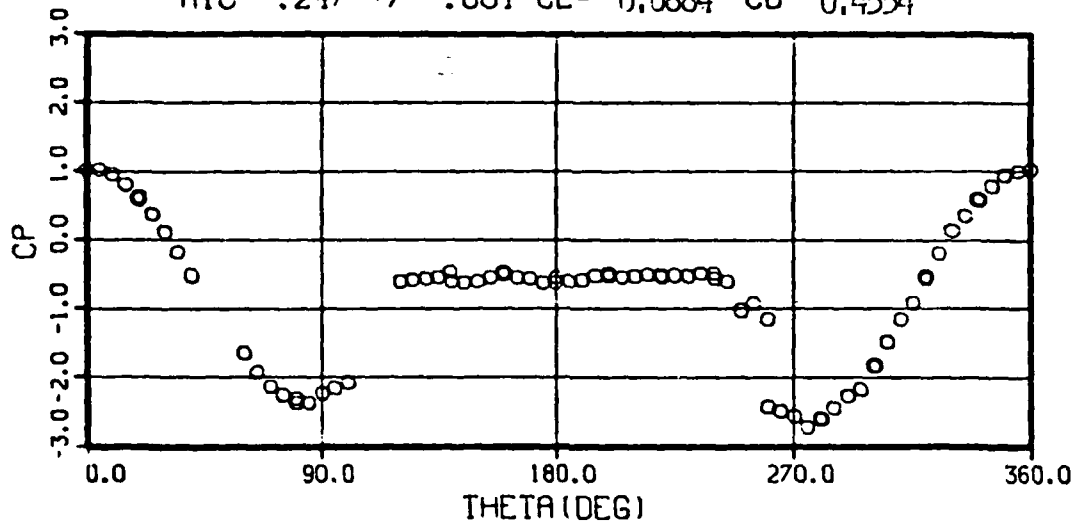
MIU- .242 +/- .001 CL- -0.0624 CD- 0.2856



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 173 OIU- 30.7 +/- .16 RNDIU- .615 +/- .002
 PIU- 722. +/- 3.80 VIU-276.23 +/- .426
 MIU- .247 +/- .001 CL- 0.0884 CD- 0.4554



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

AD-A160 351

ANALYSIS OF FLUID FLOW AT VERY HIGH REYNOLDS NUMBER
AROUND SMOOTH & ROUGH. (U) ALABAMA A AND A UNIV NORMAL
DEPT OF PHYSICS S S MURTY ET AL. JUL 85
N00014-83-K-0351

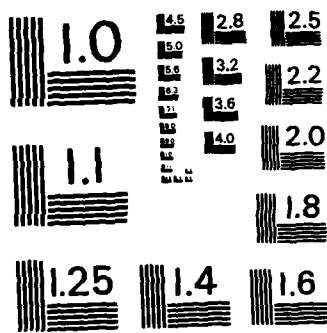
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UNCLASSIFIED

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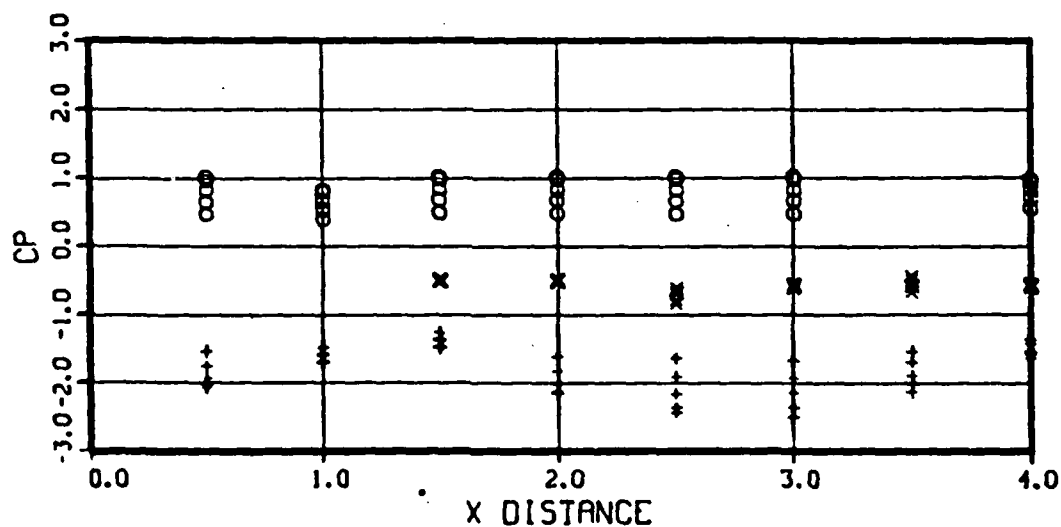
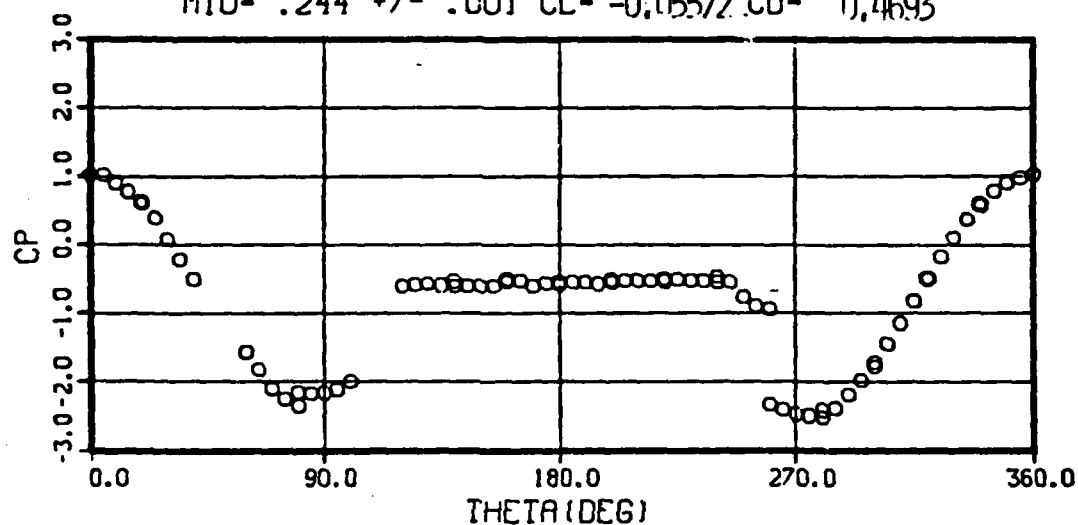
MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

CYLINDER + NO. 250 MESH SCREEN

RUN 174 OIU- 35.5 +/- .14 RNDIU- .711 +/- .003

PIU- 848. +/- 3.80 VIU-274.39 +/- .330

MIU- .244 +/- .001 CL- -0.05572 CD- 0.4693



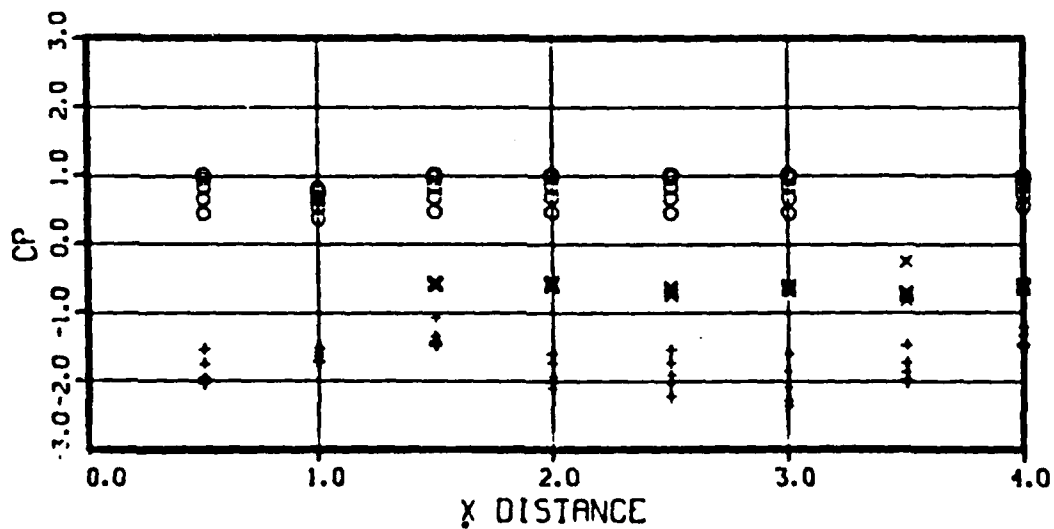
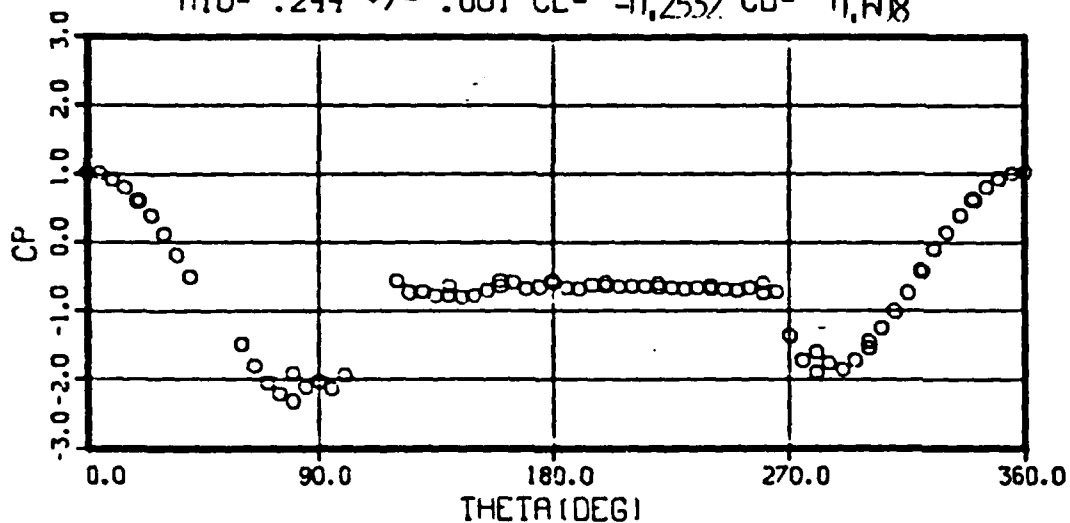
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 177 OIU- 51.2 +/- .30 RNDIU-1.017 +/- .004

PIU- 1225. +/- 3.80 VIU-275.51 +/- .490

MIU- .244 +/- .001 CL- -0.2532 CD- 0.608



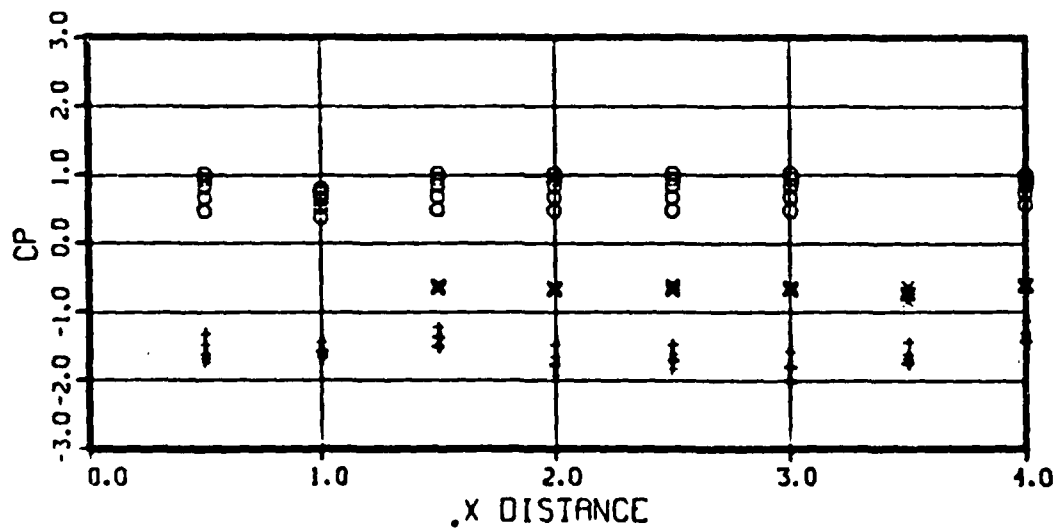
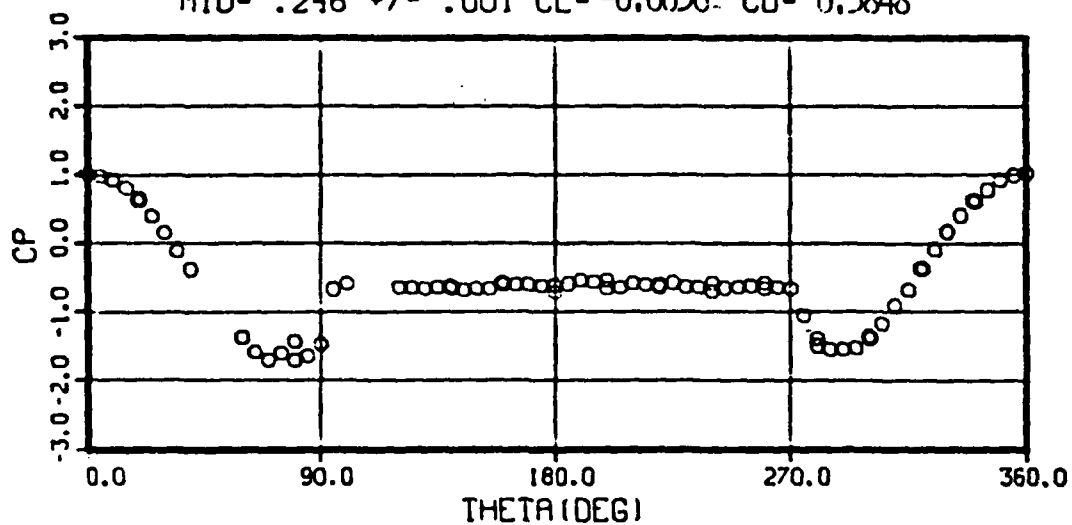
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 178 OIU- 65.0 +/- .40 RNDIU-1.273 +/- .006

PIU- 1534. +/- 3.20 VIU-278.07 +/- .584

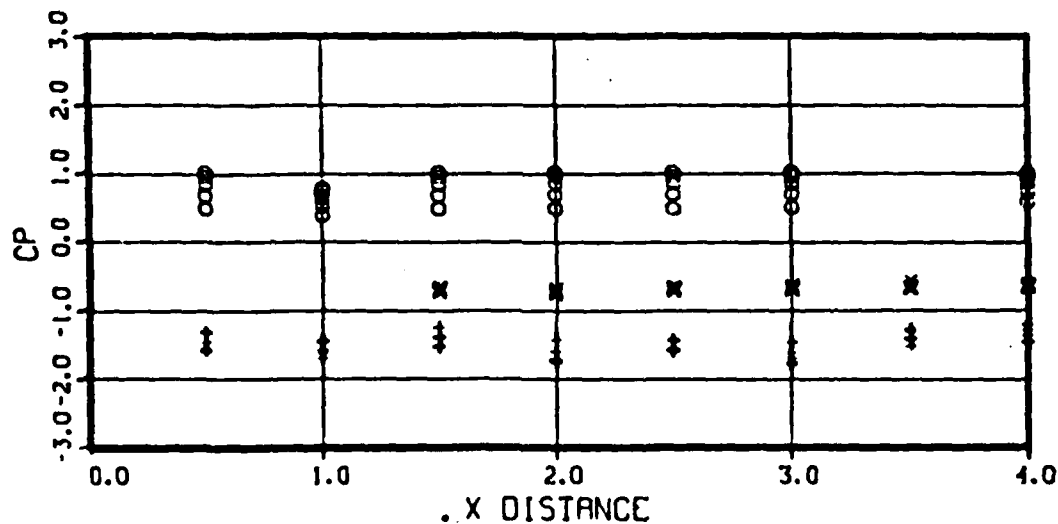
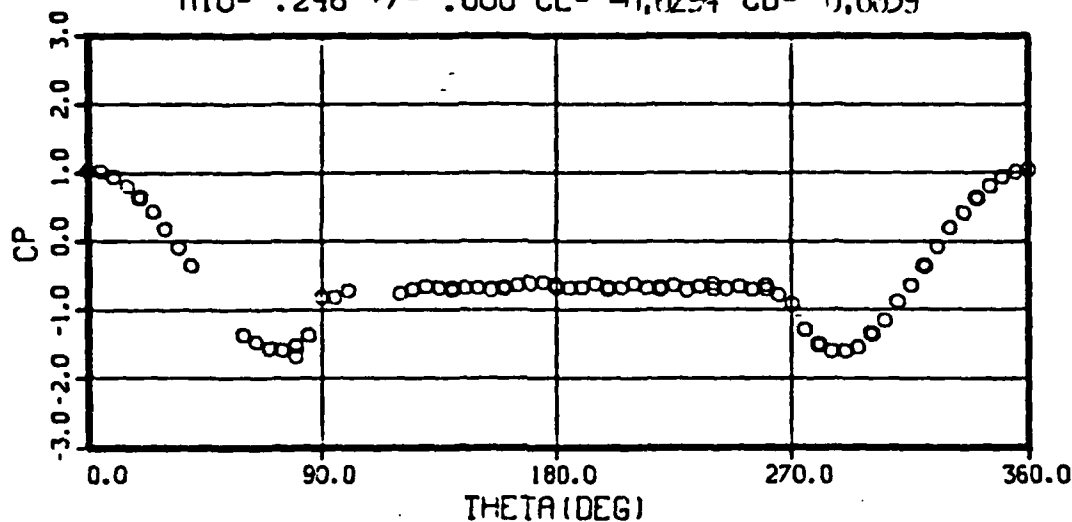
MIU- .246 +/- .001 CL- -0.0036 CD- 0.5848



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

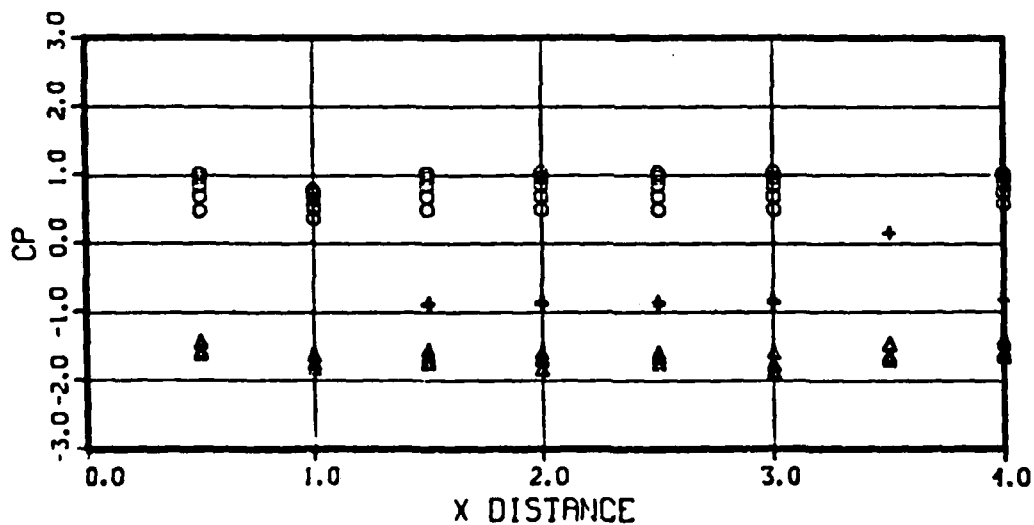
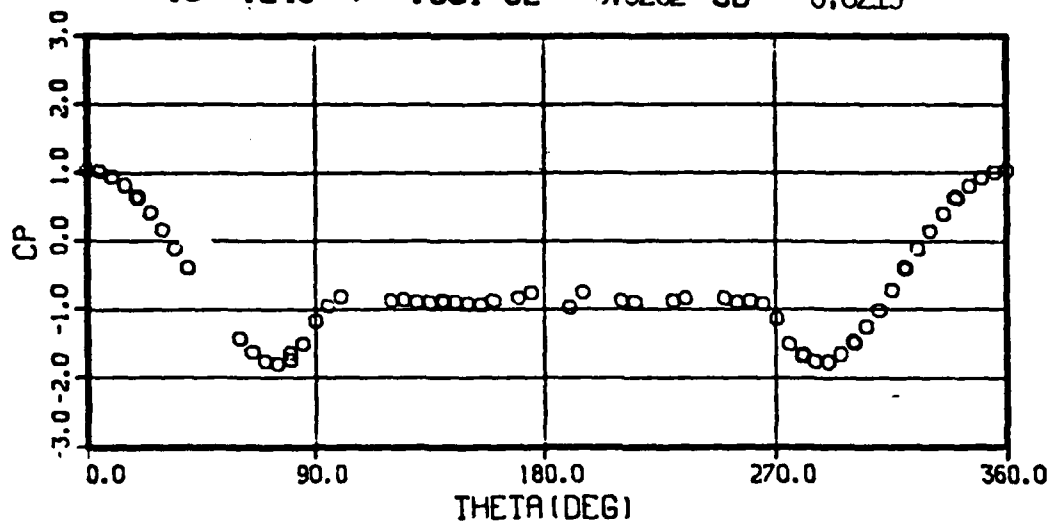
CYLINDER + NO. 250 MESH SCREEN

RUN 179 OIU- 78.5 +/- .16 RNDIU-1.529 +/- .001
 PIU- 1854. +/- 3.40 VIU-278.72 +/- .498
 MIU- .246 +/- .000 CL- -0.0294 CD- 0.6539



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN
 RUN 181 OIU-102.9 +/- .68 RNDIU-2.052 +/- .008
 PIU- 2423. +/- 8.80 VIU-276.28 +/- .968
 MIU- .246 +/- .001 CL- -0.0262 CD- 0.8219



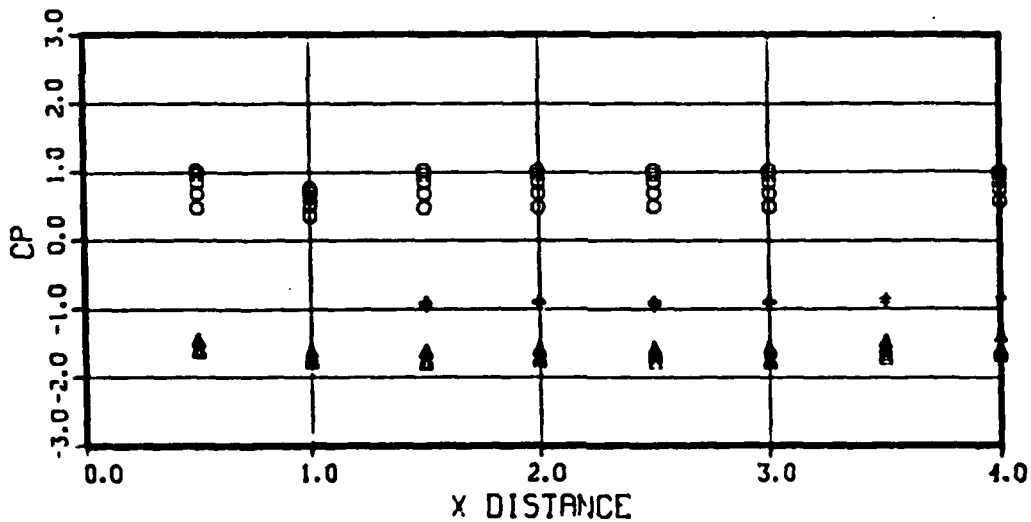
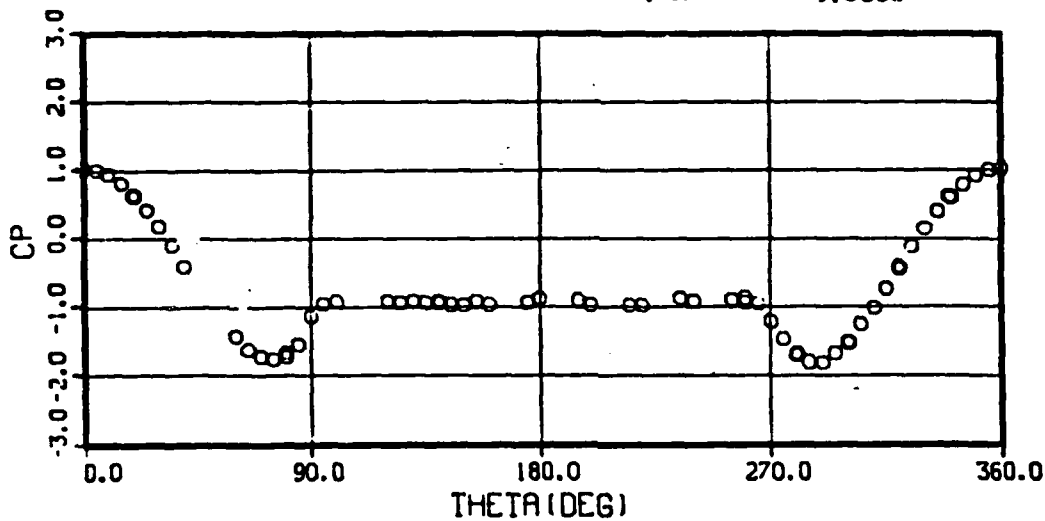
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 182 OIU-133.2 +/- .64 RNDIU-2.578 +/- .005

PIU- 3143. +/- 7.20 VIU-279.45 +/- .578

MIU- .246 +/- .000 CL- -0.026 CD- 0.8686



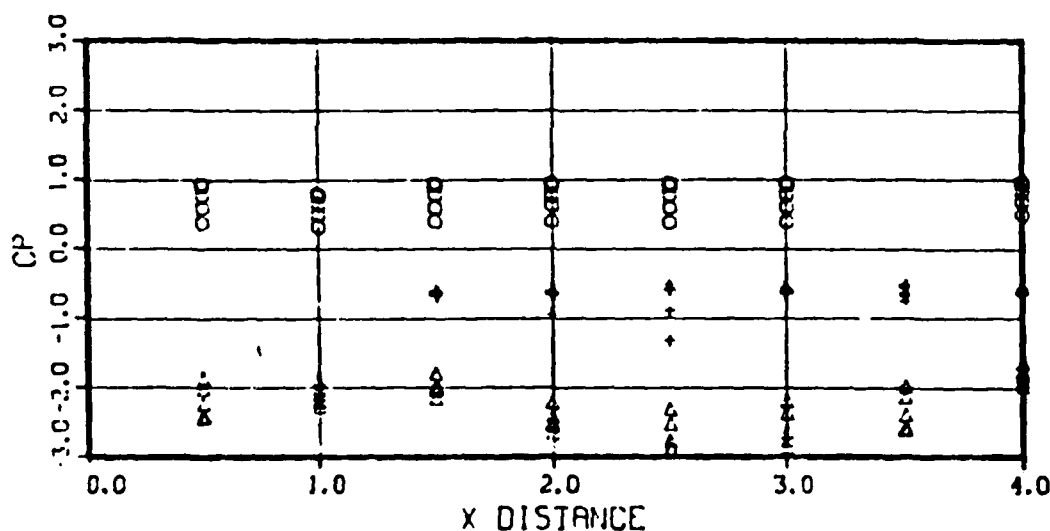
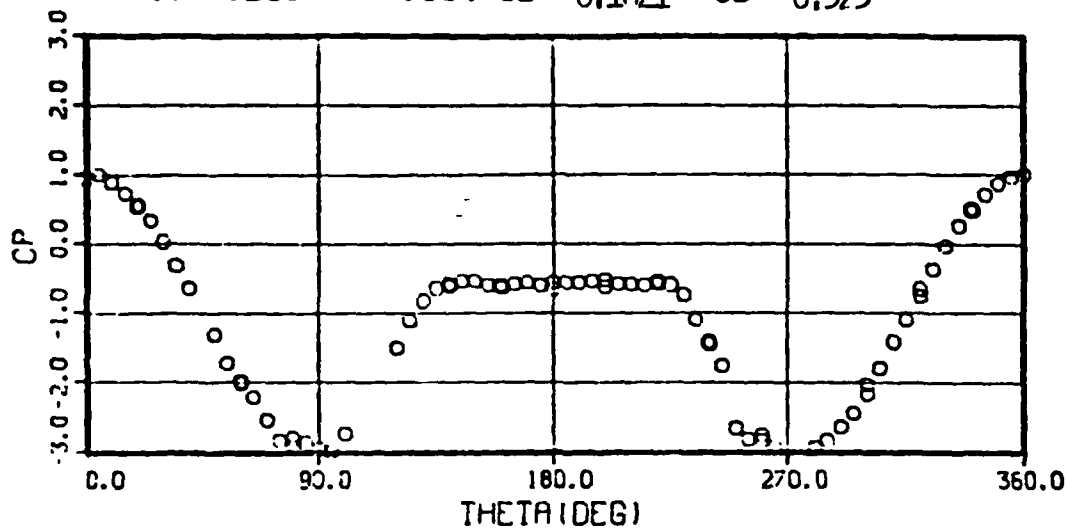
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 188 OIU- 20.1 +/- .82 RNDIU- .421 +/- .009

PIU- 501. +/- 4.00 VIU-266.32 +/- 4.716

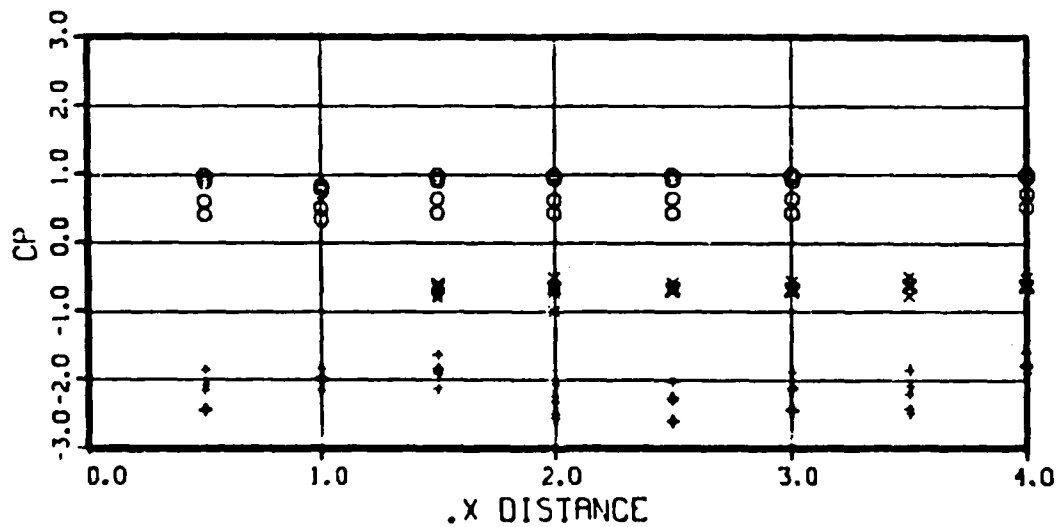
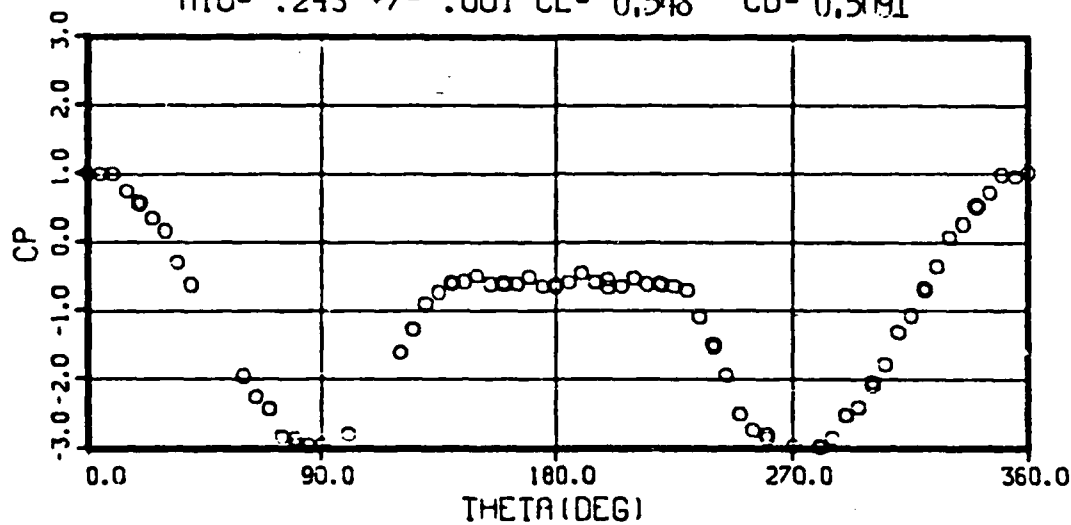
MIU- .239 +/- .004 CL- 0.1021 CD- 0.523



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 250 MESH SCREEN

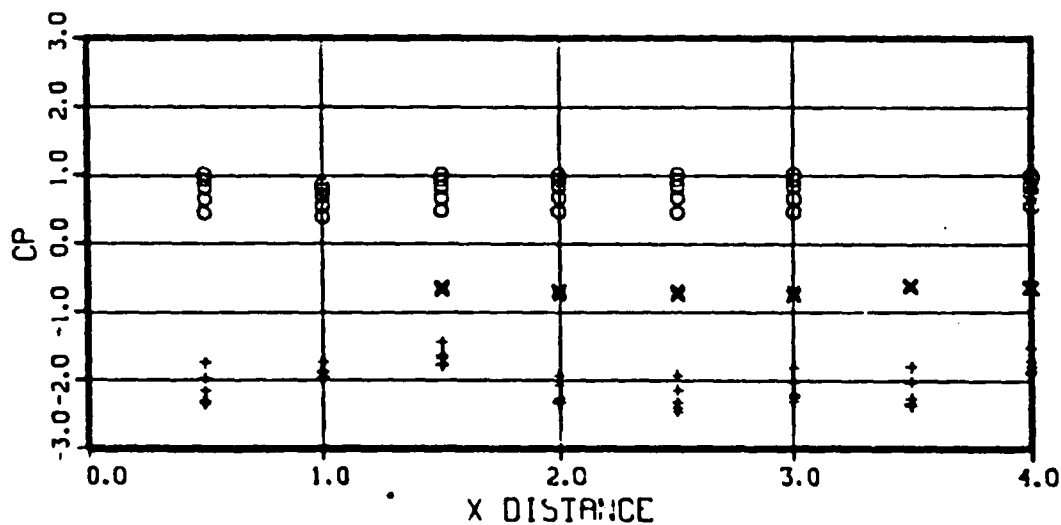
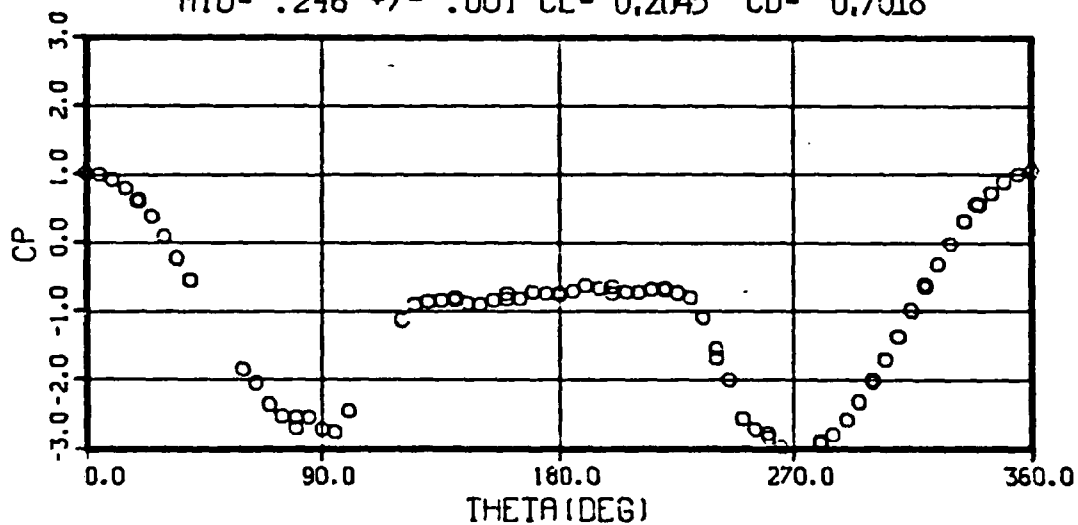
RUN 189 OIU- 25.0 +/- .40 RNDIU- .509 +/- .006
 PIU- 604. +/- 4.00 VIU-272.05 +/- 1.488
 MIU- .243 +/- .001 CL- 0.548 CD- 0.5091



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-C 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 193 OIU- 36.4 +/- .26 RNDIU- .721 +/- .004
 PIU- 858. +/- 4.80 VIU-277.10 +/- .536
 MIU- .246 +/- .001 CL- 0.2045 CD- 0.7018



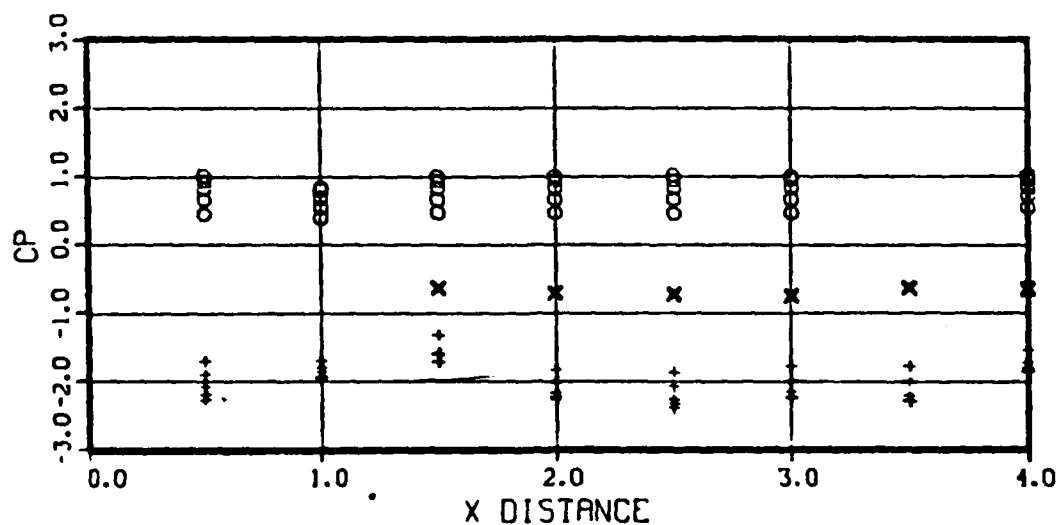
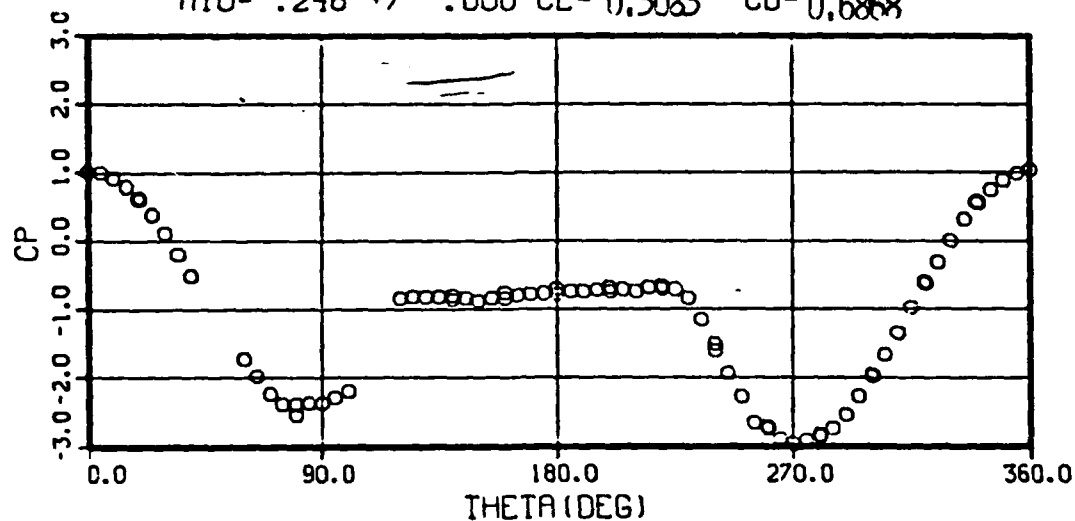
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 194 OIU- 41.7 +/- .18 RNDIU- .823 +/- .004

PIU- 984. +/- 4.60 VIU-277.31 +/- .556

MIU- .246 +/- .000 CL- 0.3063 CD- 0.6858



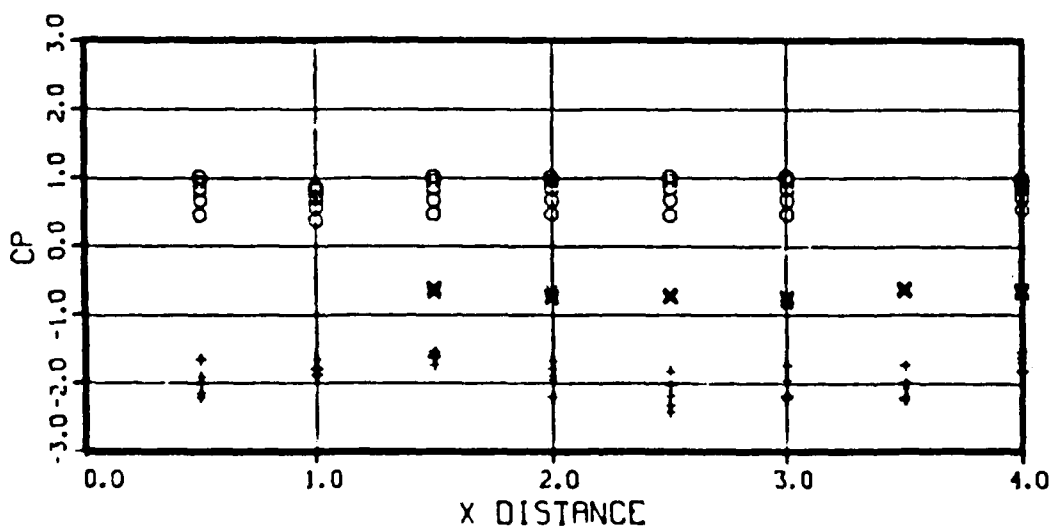
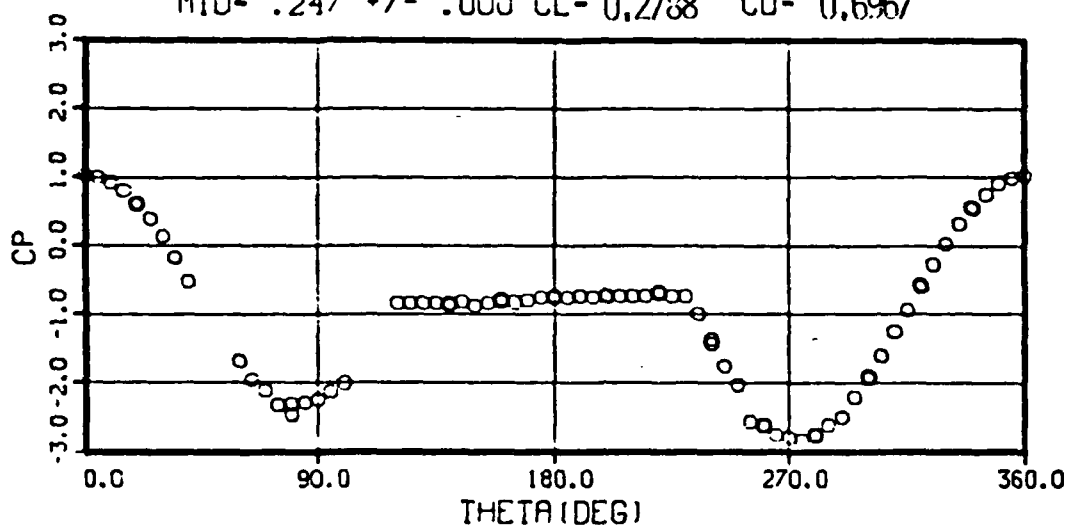
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-- + 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 195 OIU- 47.1 +/- .20 RNDIU- .923 +/- .004

PIU- 1103. +/- 4.00 VIU-278.65 +/- .242

MIU- .247 +/- .000 CL- 0.2738 CD- 0.6967



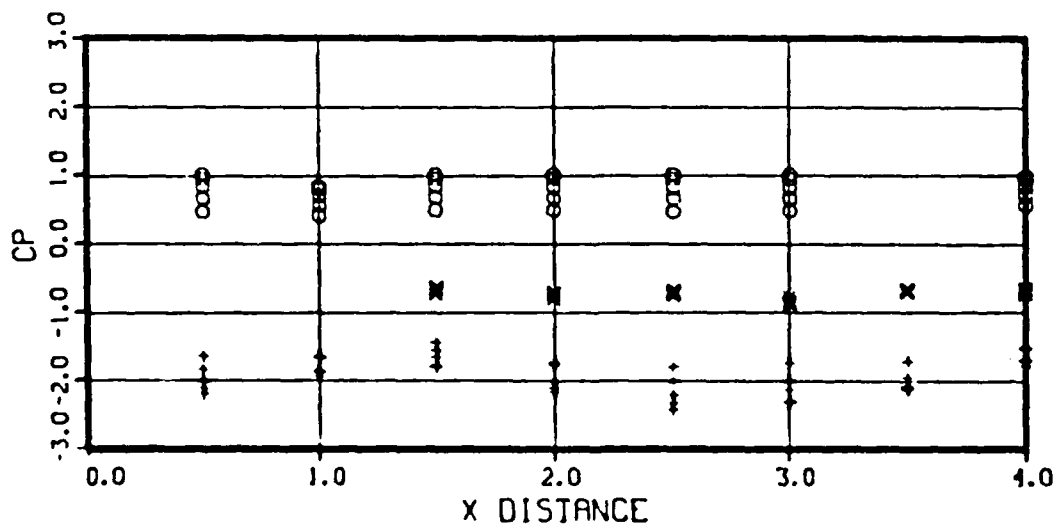
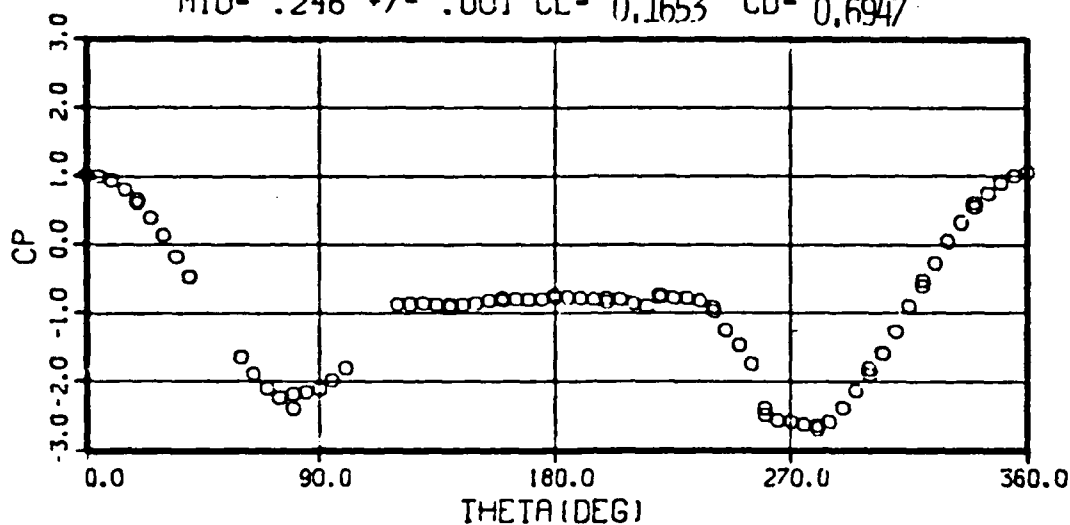
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-O 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 196 OIU- 52.3 +/- .28 RNDIU-1.025 +/- .006

PIU- 1232. +/- 7.60 VIU-278.25 +/- .558

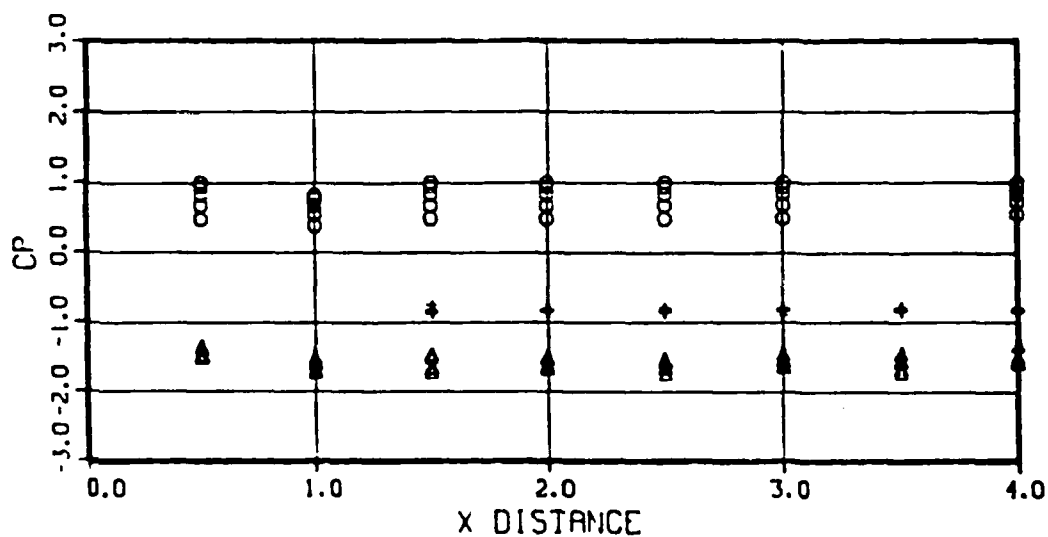
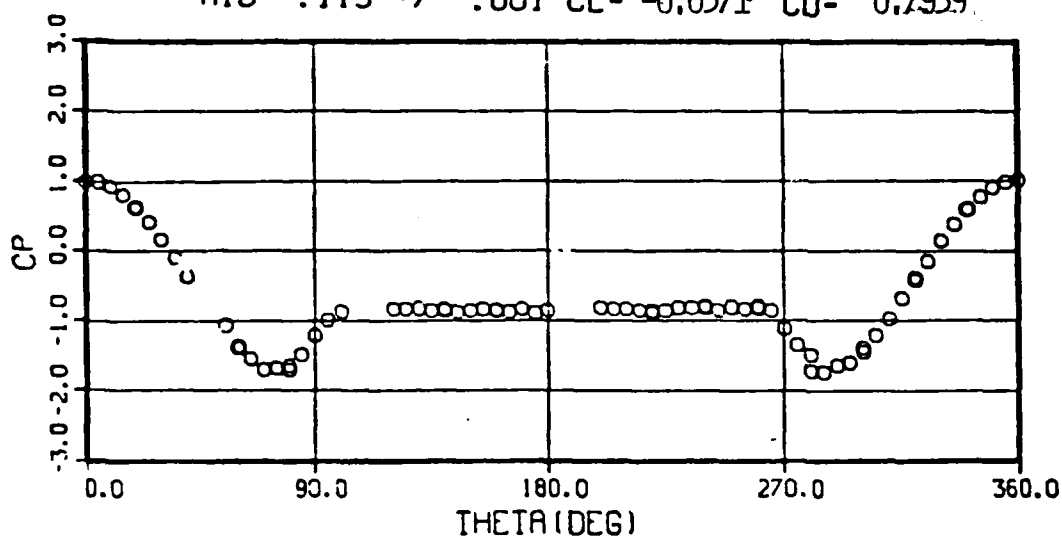
MIU- .246 +/- .001 CL- 0.1653 CD- 0.6947



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 212 OIU- 71.9 +/- .34 RNDIU-2.982 +/- .008
 PIU- 7722. +/- 5.00 VIU-130.80 +/- .292
 MIU- .115 +/- .001 CL- -0.0371 CD- 0.7959



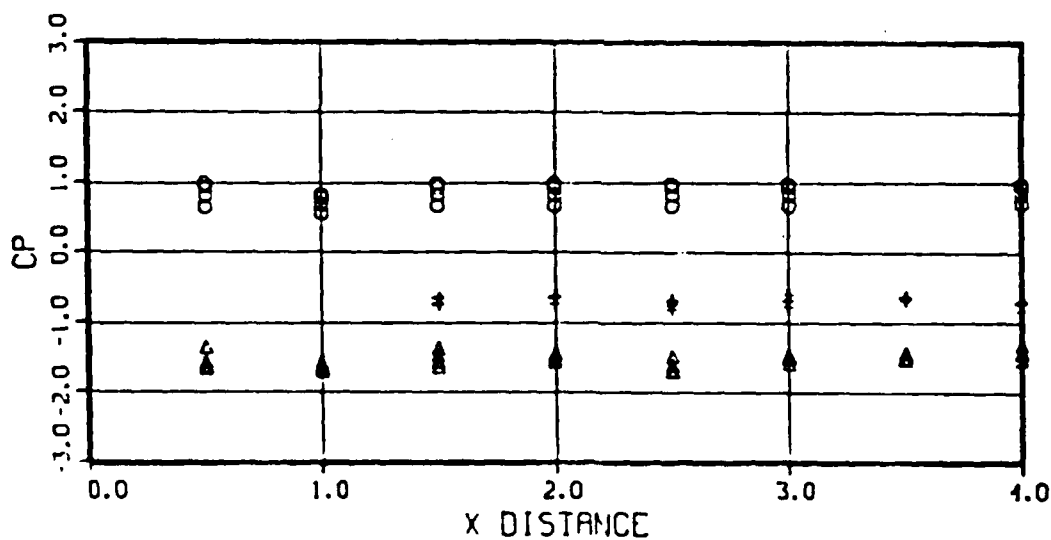
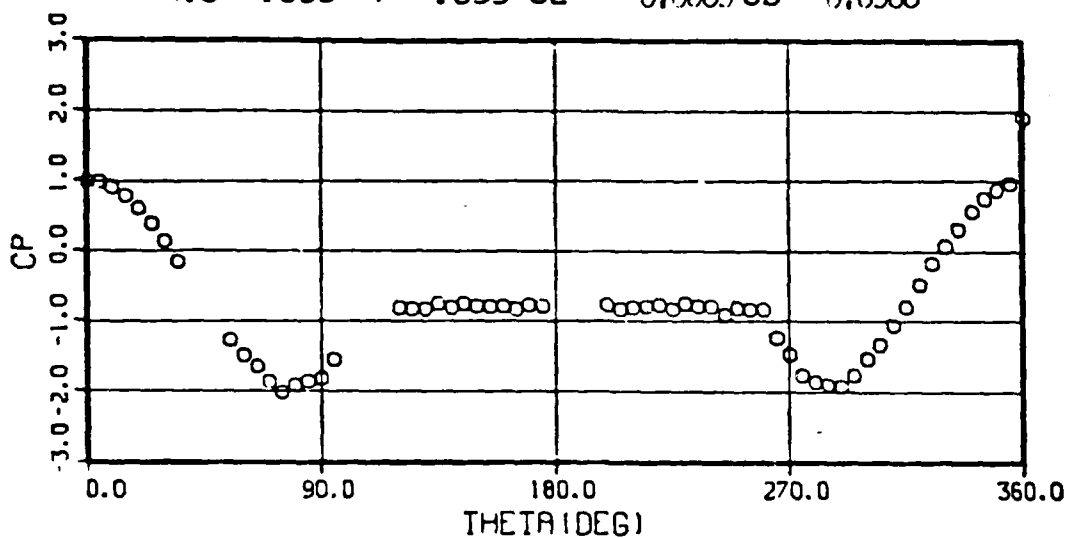
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 211 OIU- 21.0 +/- 20.96 RNDIU-1.445 +/-xxxx

PIU- 6211. +/- 6210.60 VIU- 62.94 +/- 62.940

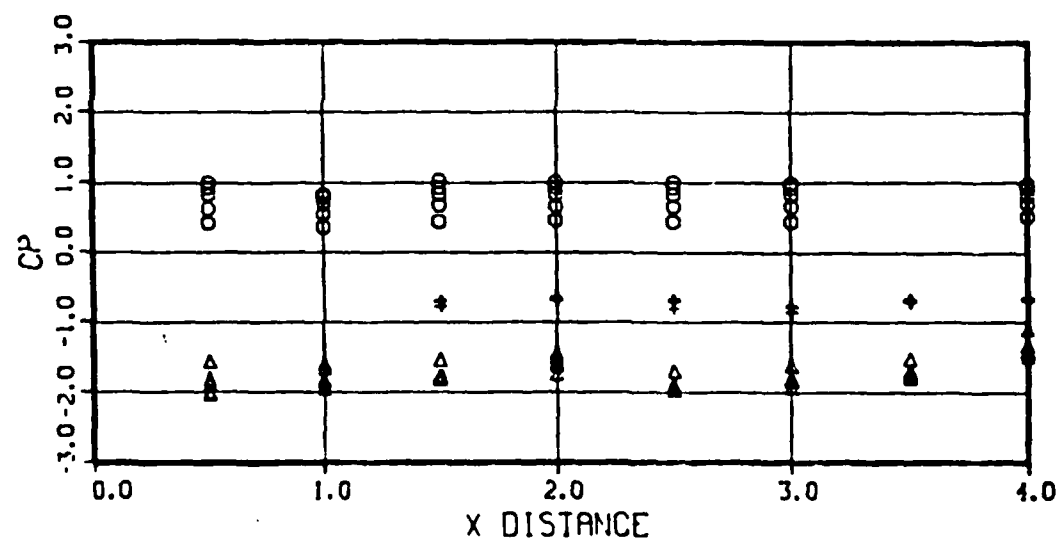
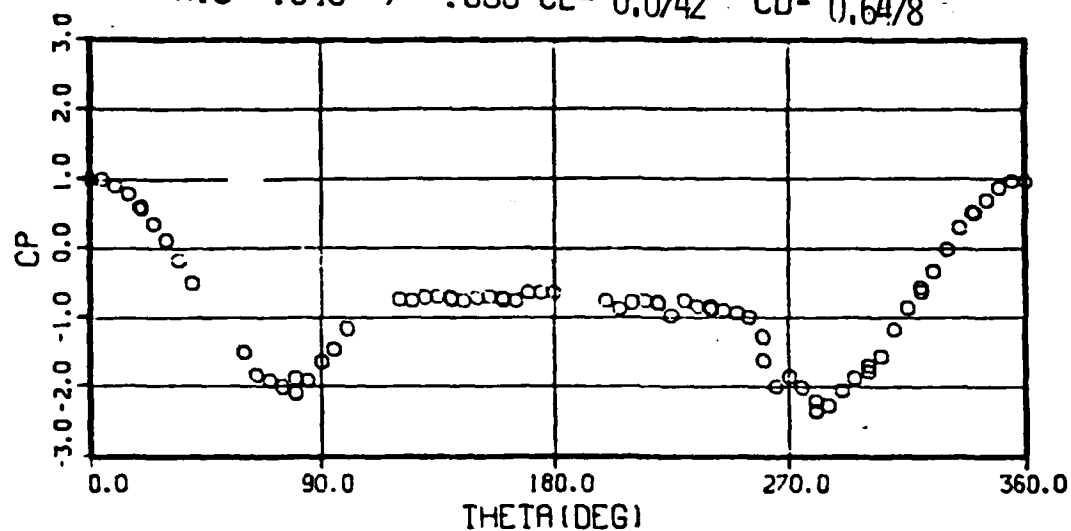
MIU- .055 +/- .055 CL- -0.0689 CD- 0.6988



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-O 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 210 OIU- 11.5 +/- .06 RNDIU-1.194 +/- .003
 PIU- 7780. +/- 10.80 VIU- 51.96 +/- .128
 MIU- .046 +/- .000 CL- 0.0742 CD- 0.6478



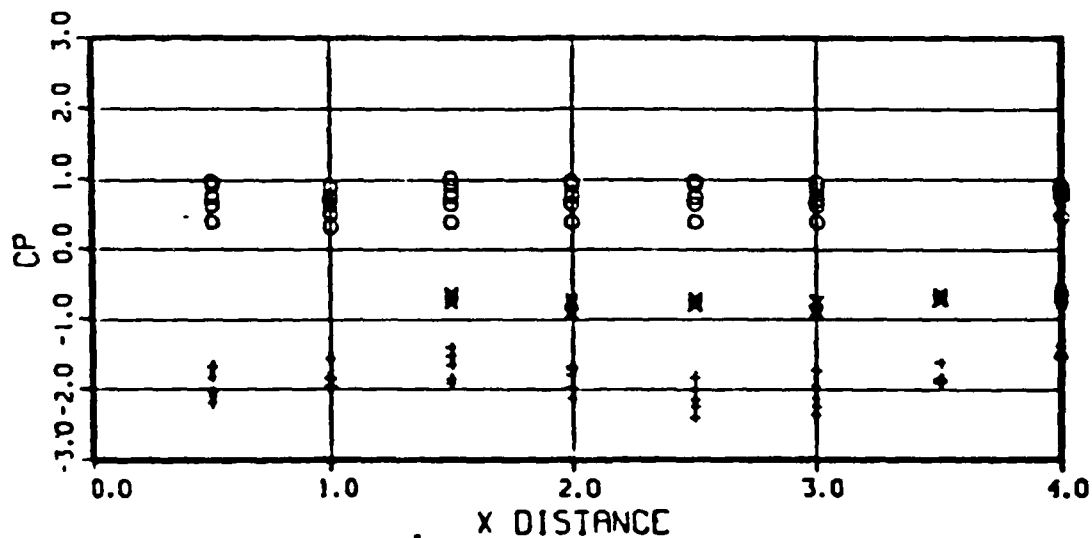
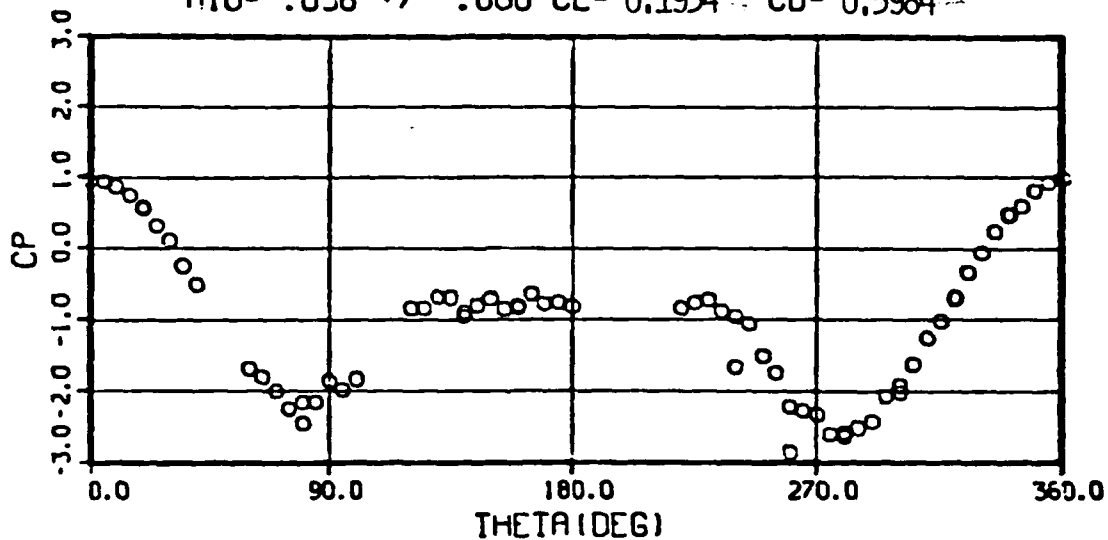
LEGEND
 ○ - 4 DEG
 △ - 24 DEG
 + - 124 DEG

CYLINDER + NO. 250 MESH SCREEN

RUN 209 OIU- 7.2 +/- .00 RNDIU- .944 +/- .001

PIU- 7781. +/- 33.20 VIU- 41.24 +/- .054

MIU- .036 +/- .000 CL- 0.1934 CD- 0.5984



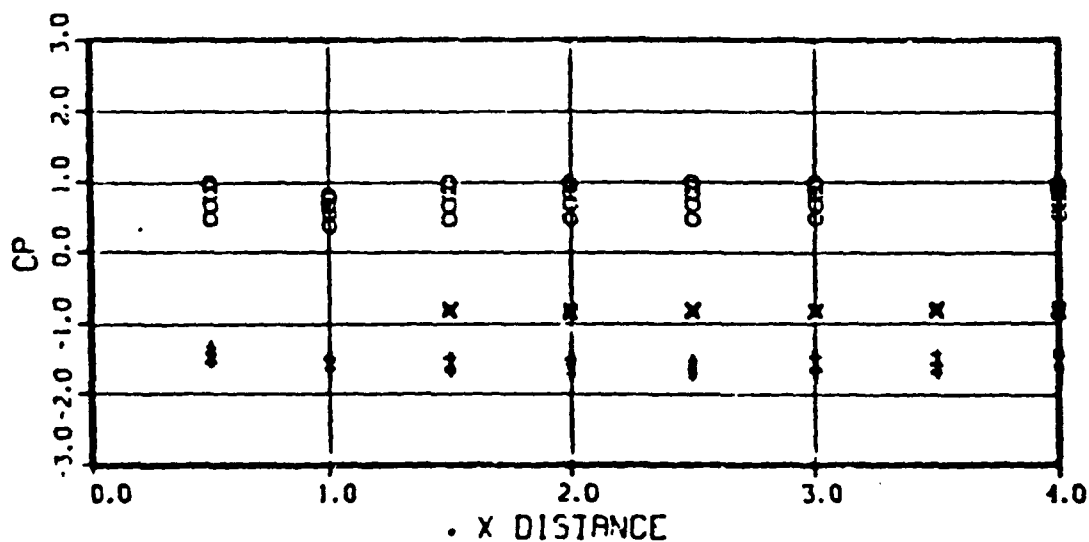
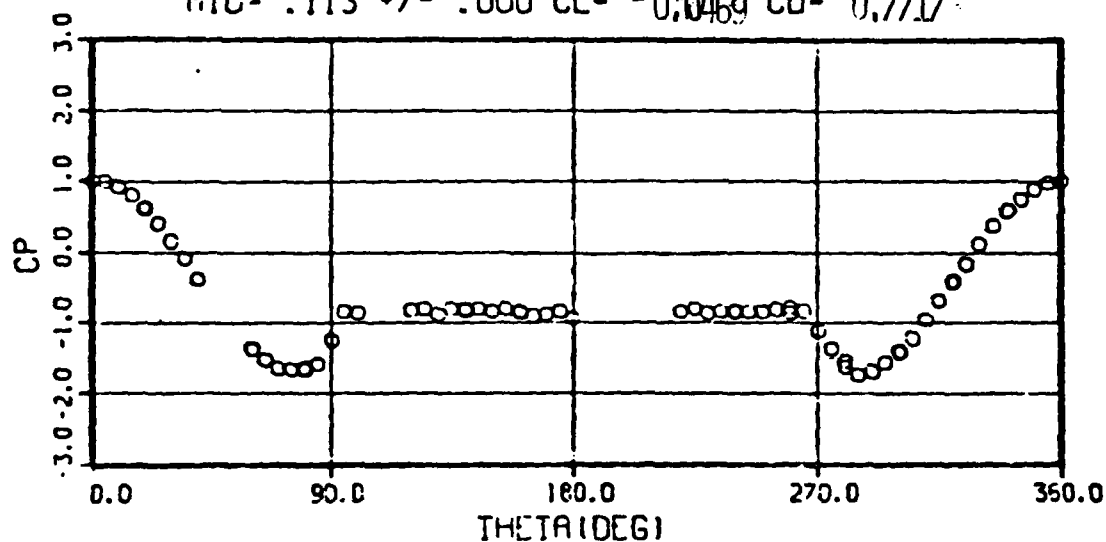
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 208 OIU- 68.3 +/- .48 RNDIU-2.887 +/- .007

PIU- 7682. +/- 25.40 VIU-127.98 +/- .332

MIU- .113 +/- .000 CL- -0.0469 CD- 0.7717



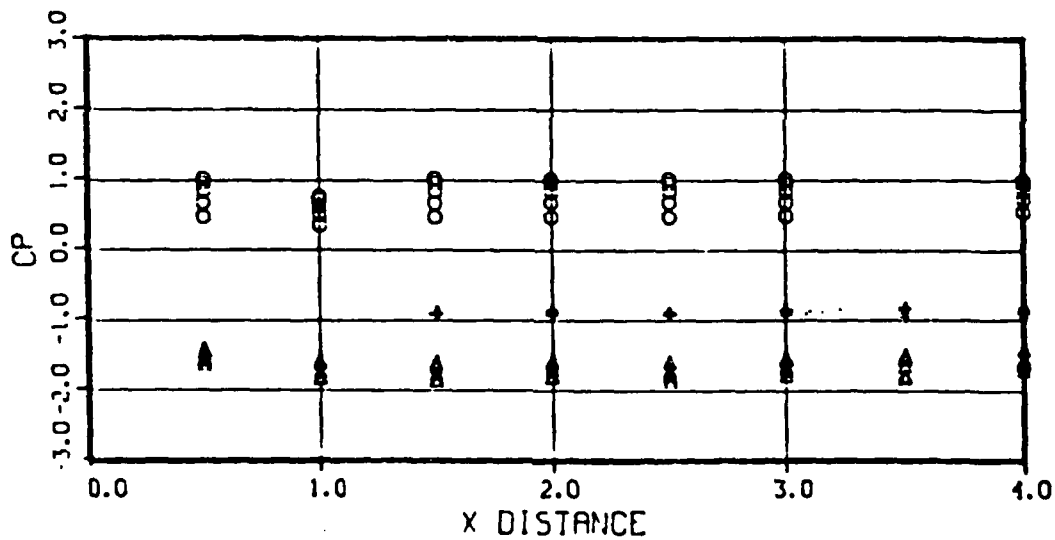
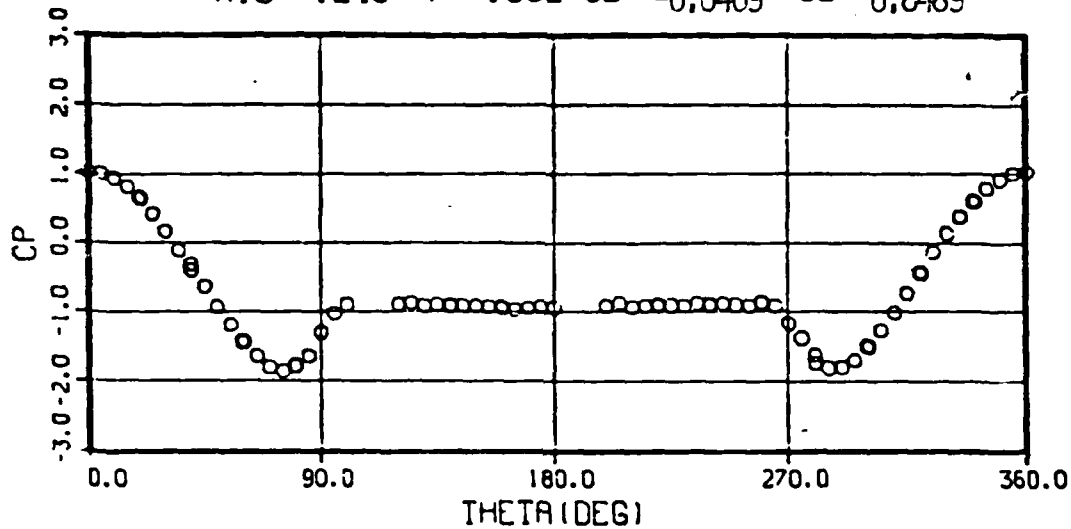
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 205 OIU-387.9 +/- 4.98 RNDIU-7.009 +/- .046

PIU- 9014. +/- 7.00 VIU-288.41 +/- 1.848

MIU- .248 +/- .002 CL- -0.0469 CD- 0.8489



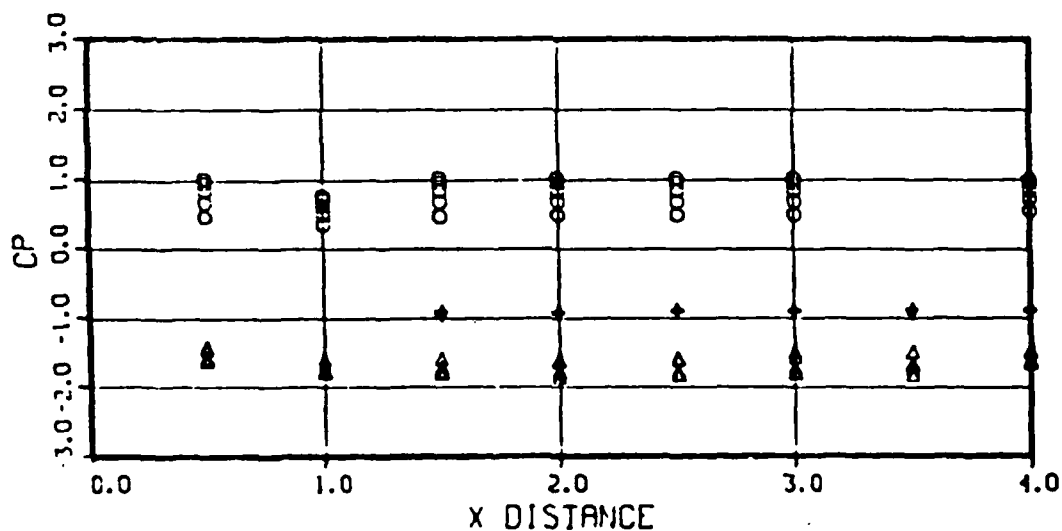
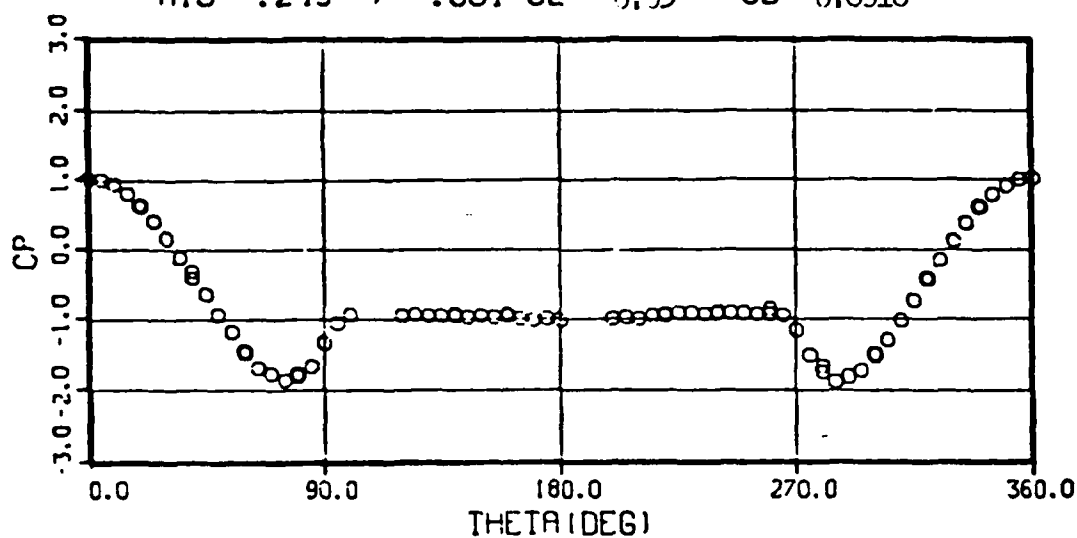
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER • NO. 250 MESH SCREEN

RUN 205 OIU-340.9 +/- 2.84 RNDIU-6.192 +/- .028

PIU- 7882. +/- 6.60 VIU-288.26 +/- 1.118

MIU- .249 +/- .001 CL- -0.03 CD- 0.8918



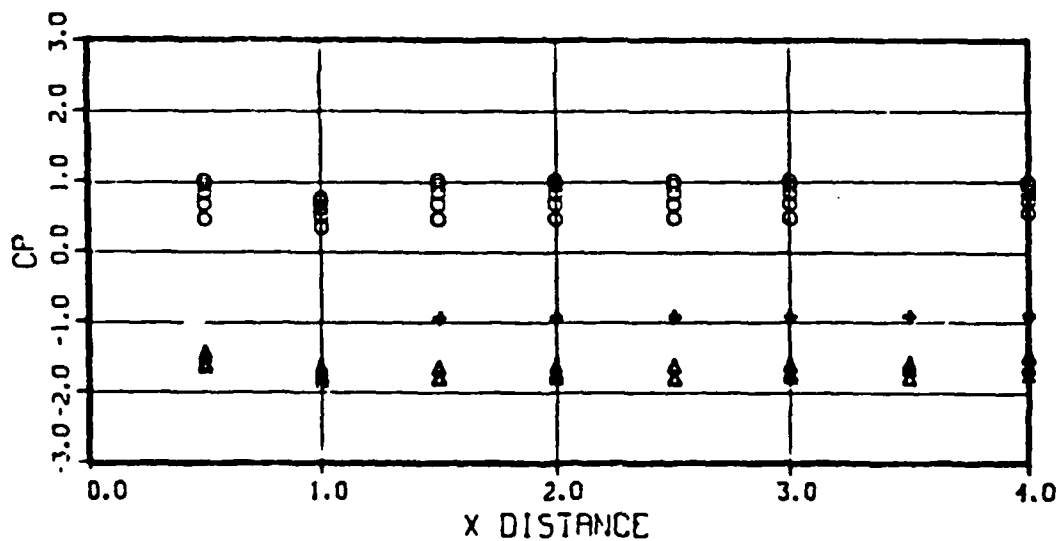
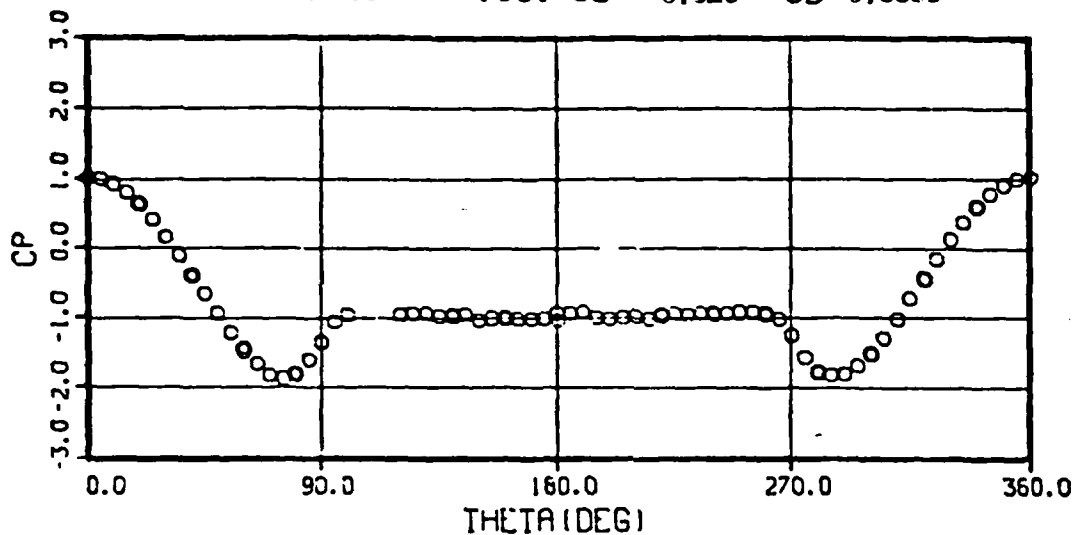
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 250 MESH SCREEN

RUN 204 OIU-279.5 +/- .56 RNDIU-5.143 +/- .006

PIU- 6506. +/- 6.20 VIU-286.20 +/- .334

MIU- .248 +/- .001 CL- -0.026 CD-0.8898



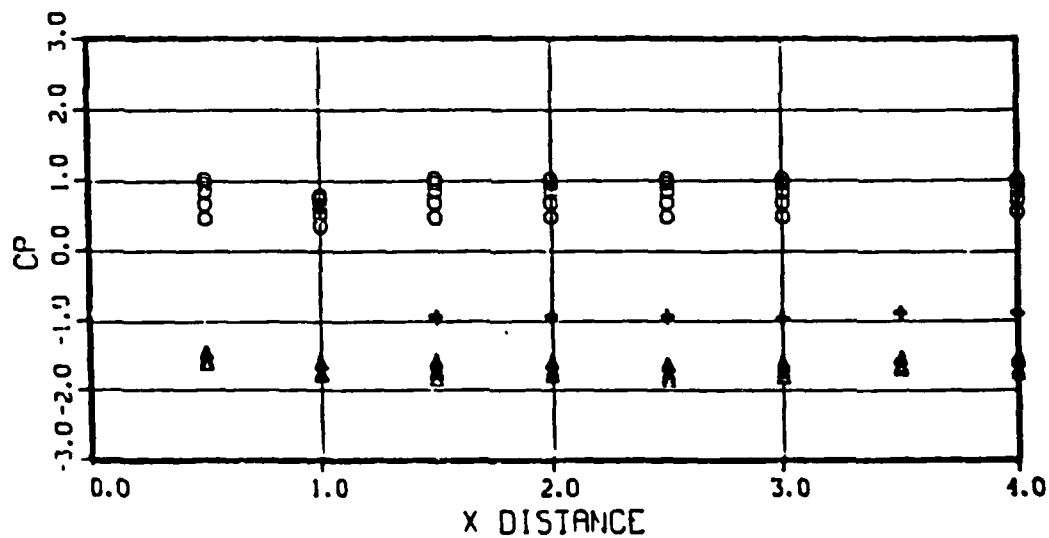
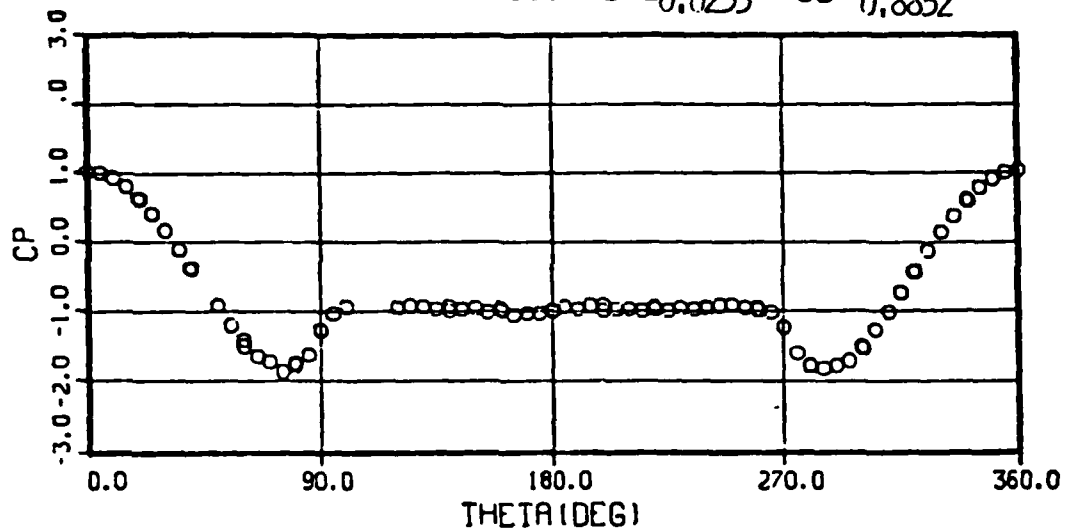
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 203 OIU-221.3 +/- 1.42 RNDIU-4.109 +/- .012

PIU- 5138. +/- 11.20 VIU-285.47 +/- .892

MIU- .248 +/- .001 CL- -0.0235 CD- 0.8852



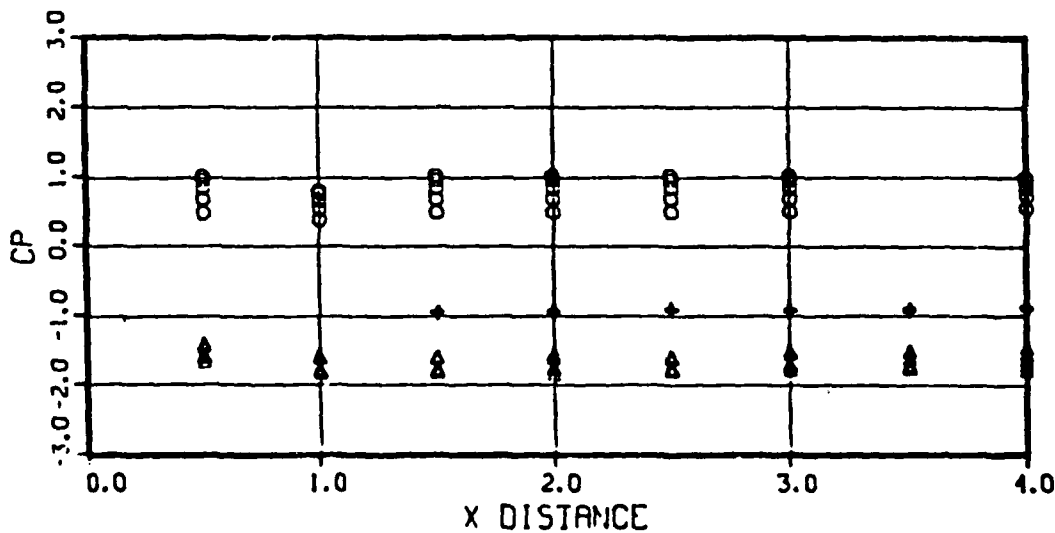
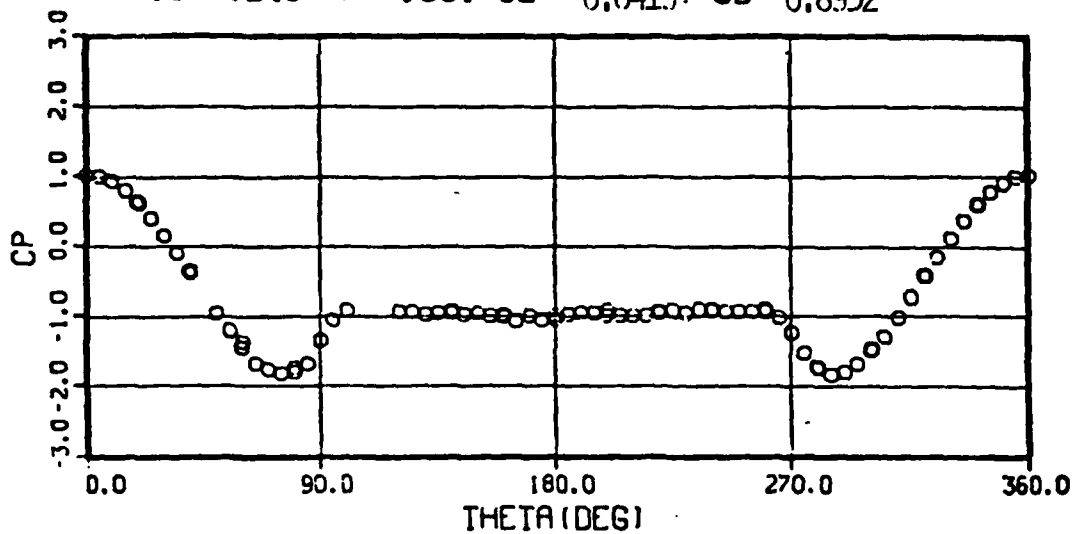
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 202 OIU-165.9 +/- 1.14 RNDIU-3.109 +/- .012

PIU- 3851. +/- 1.20 VIU-284.33 +/- .954

MIU- .248 +/- .001 CL- -0.0419 CD- 0.8952



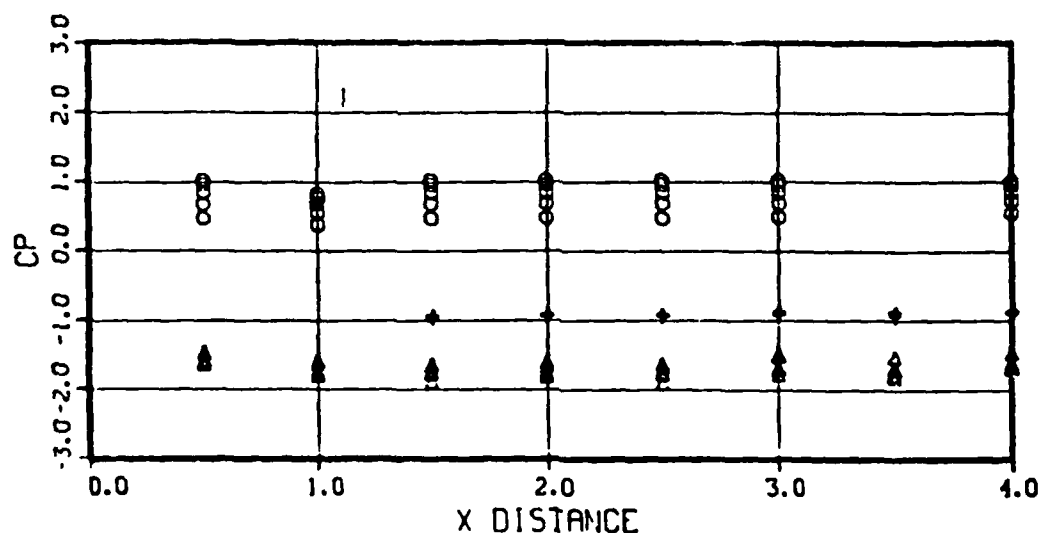
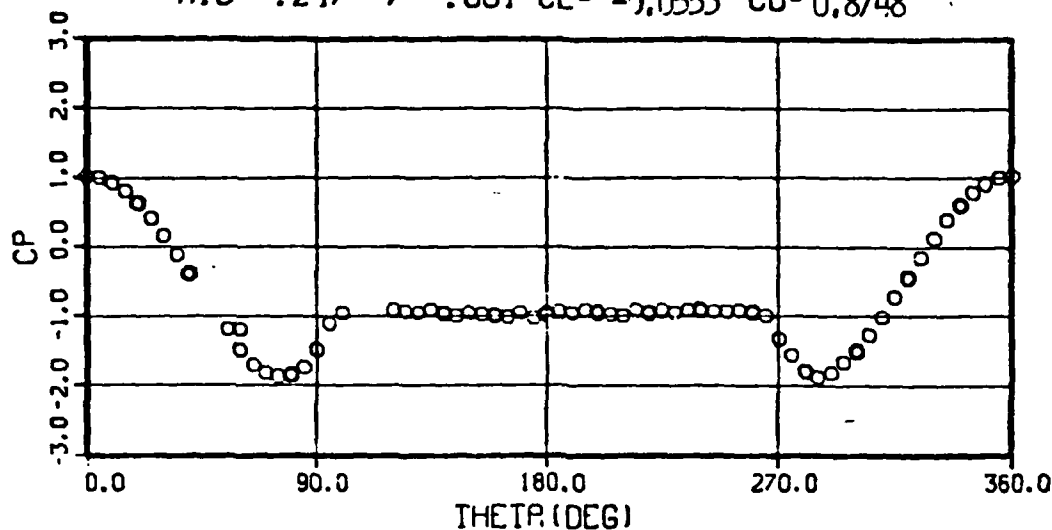
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 201 OIU-136.4 +/- .68 RNDIU-2.571 +/- .006

PIU- 3198. +/- 2.00 VIU-282.90 +/- .768

MIU- .247 +/- .001 CL- -.0553 CD-0.8748



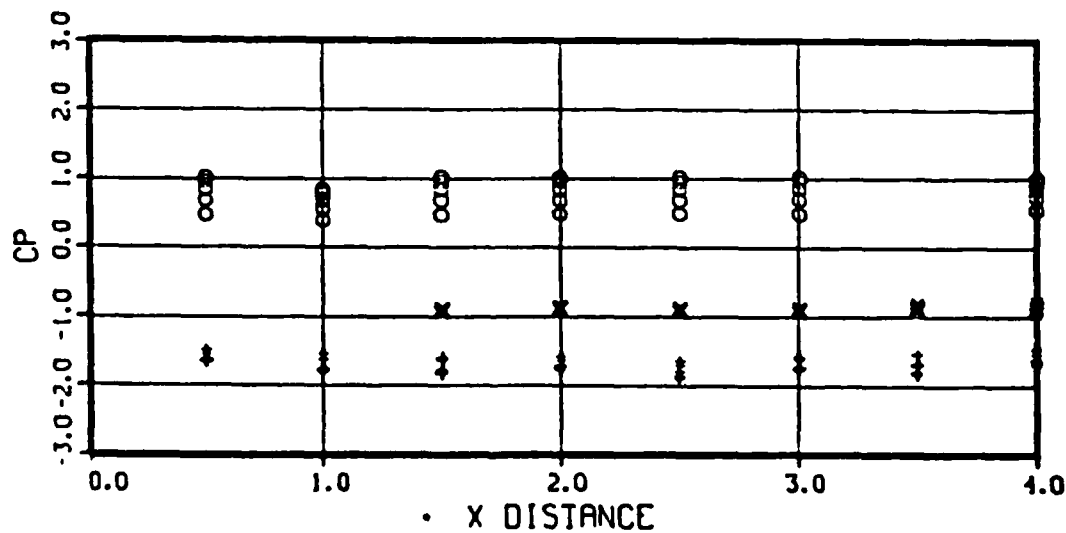
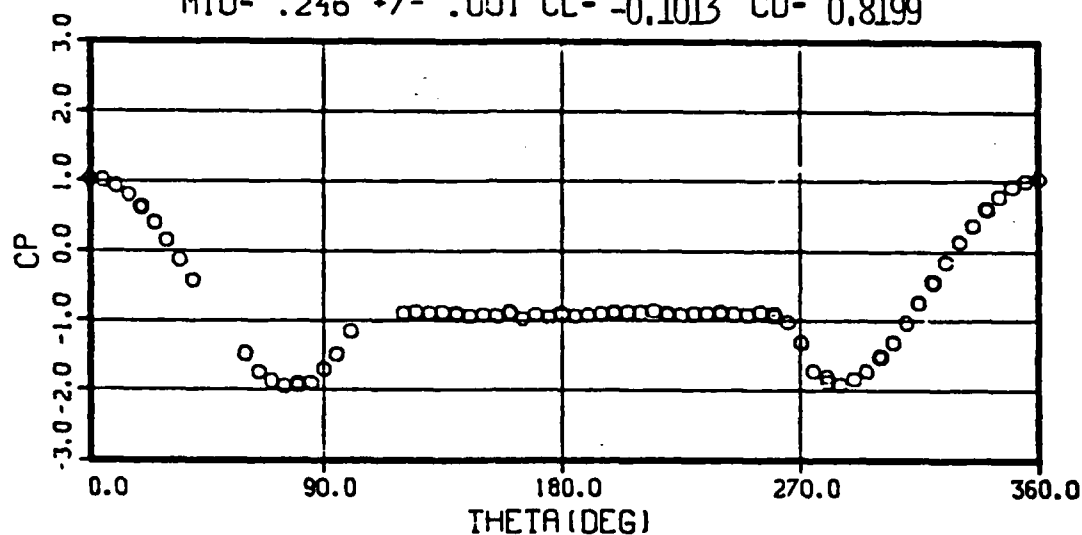
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 200 OIU-108.9 +/- .50 RNDIU-2.076 +/- .006

PIU- 2563. +/- 6.80 VIU-281.32 +/- .486

MIU- .246 +/- .001 CL- -0.1013 CD- 0.8199



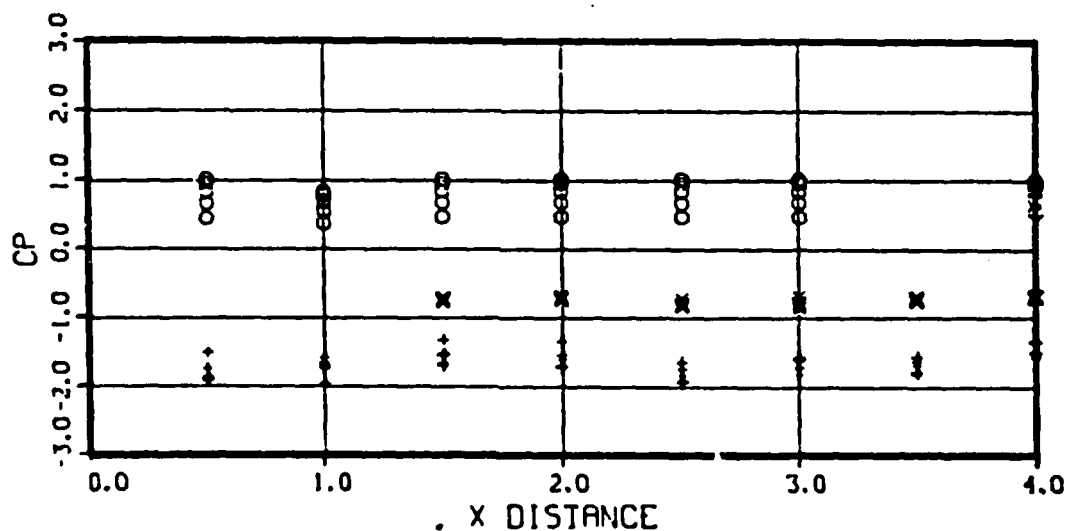
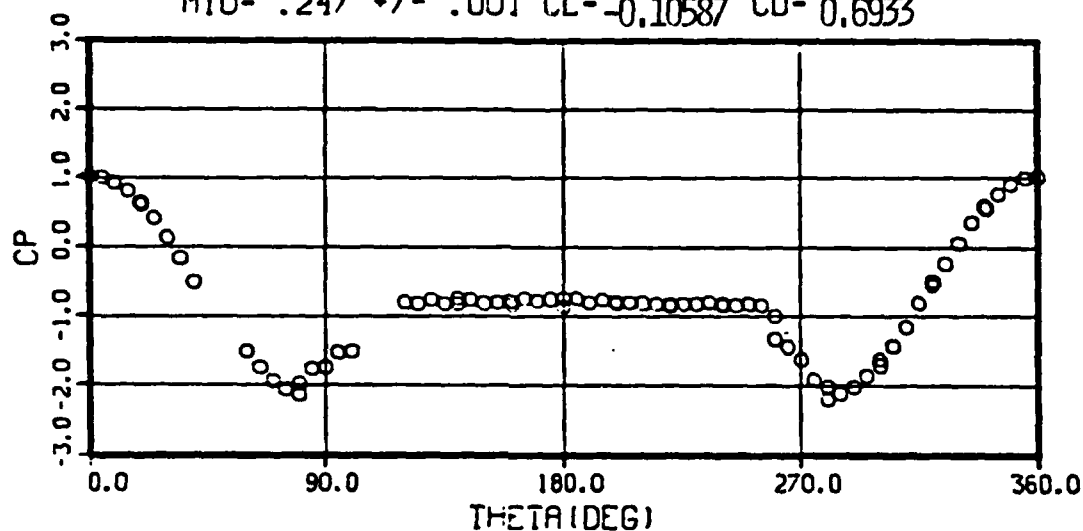
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 199 OIU- 77.7 +/- .36 RNDIU-1.532 +/- .003

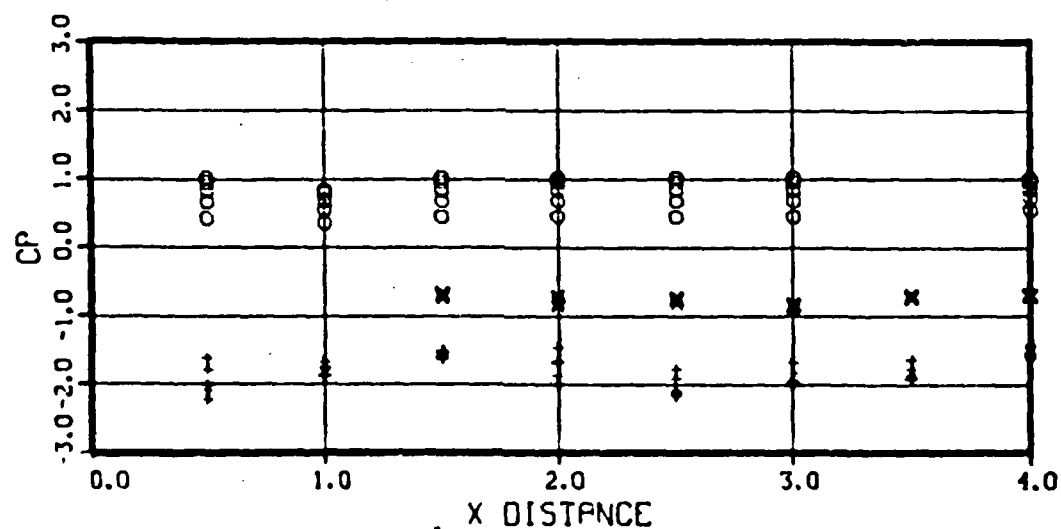
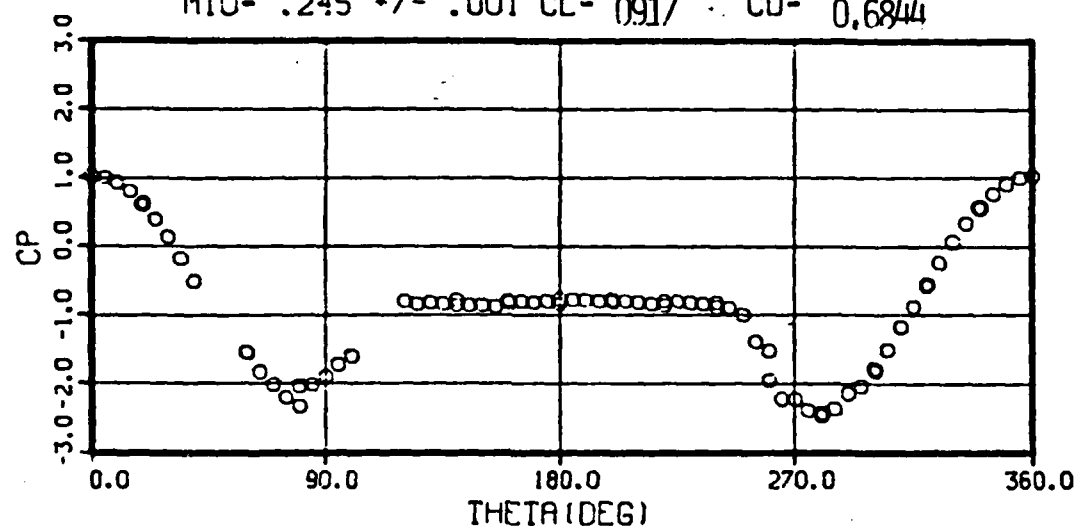
PIU- 1822. +/- 2.60 VIU-277.92 +/- .558

MIU- .247 +/- .001 CL- -0.10587 CD- 0.6933



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN
 RUN 198 OIU- 62.9 +/- .00 RNDIU-1.267 +/- .001
 PIU- 1492. +/- 2.60 VIU-274.69 +/- .098
 MIU- .245 +/- .001 CL- 0917 CD- 0.6844



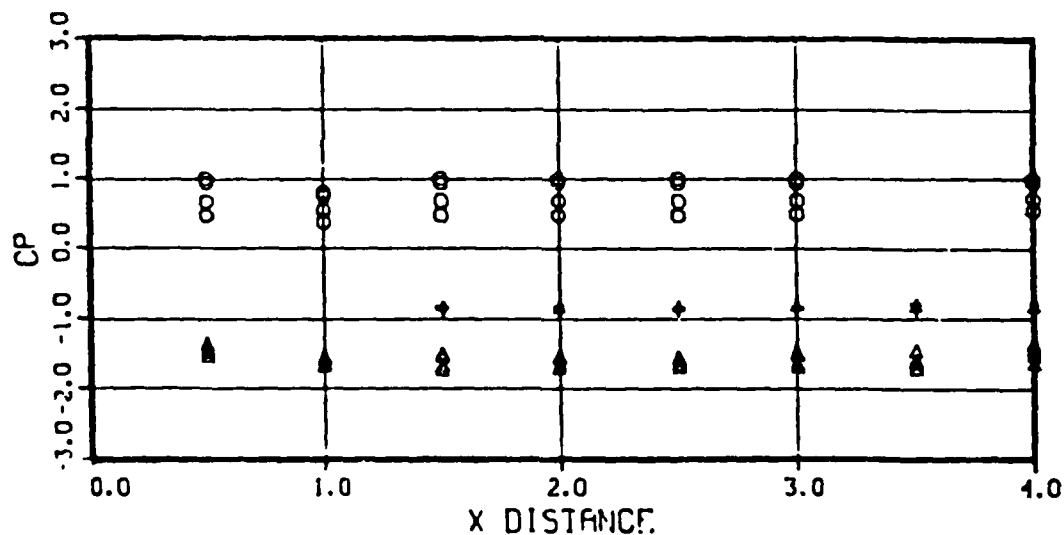
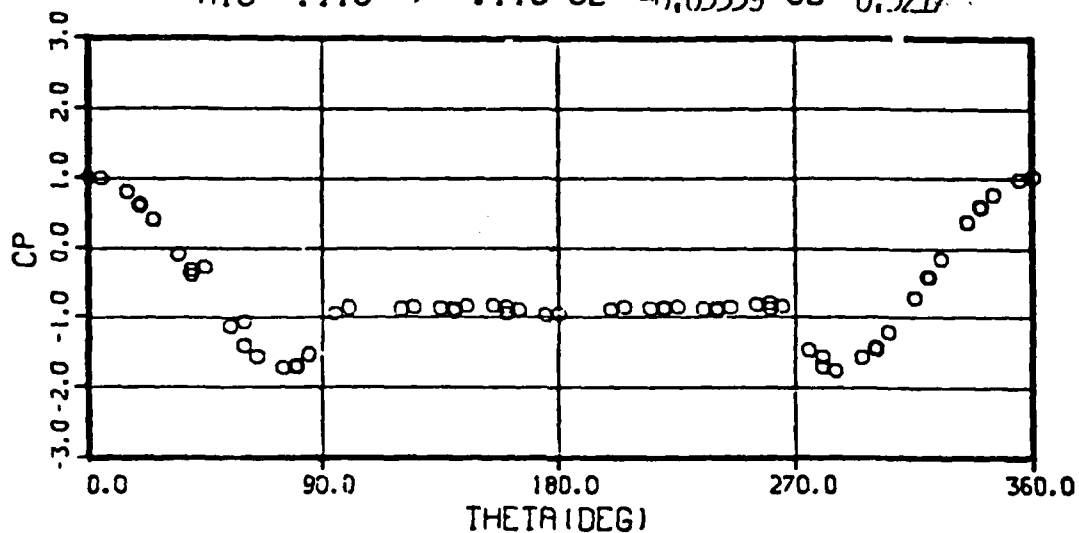
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 250 MESH SCREEN

RUN 213 OIU- 82.5 +/- 82.50 RNDIU-2.845 +/- *****

PIU- 6167. +/- 6166.60 VIU-125.54 +/- *****

MIU- .110 +/- .110 CL- -0.05539 CD- 0.5217



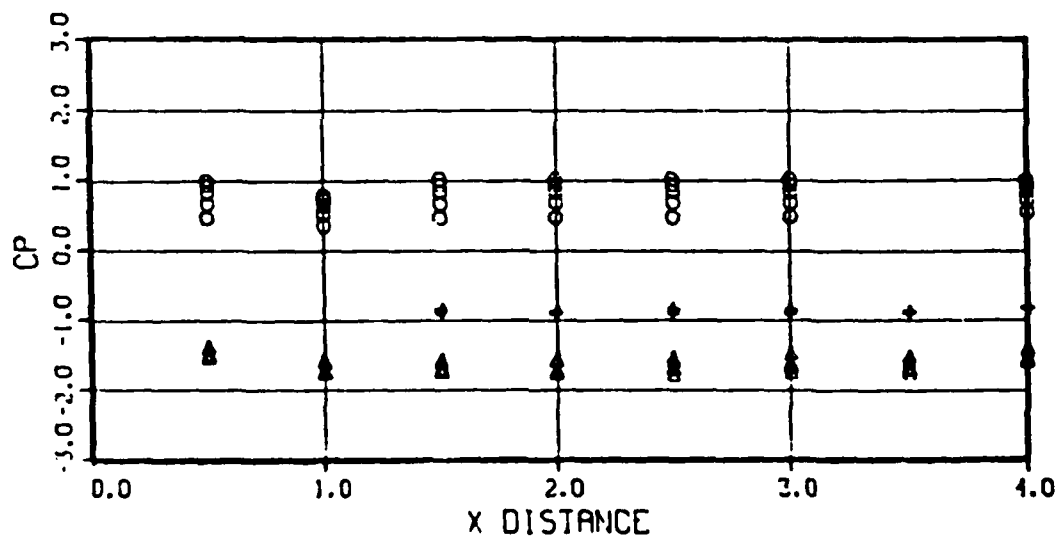
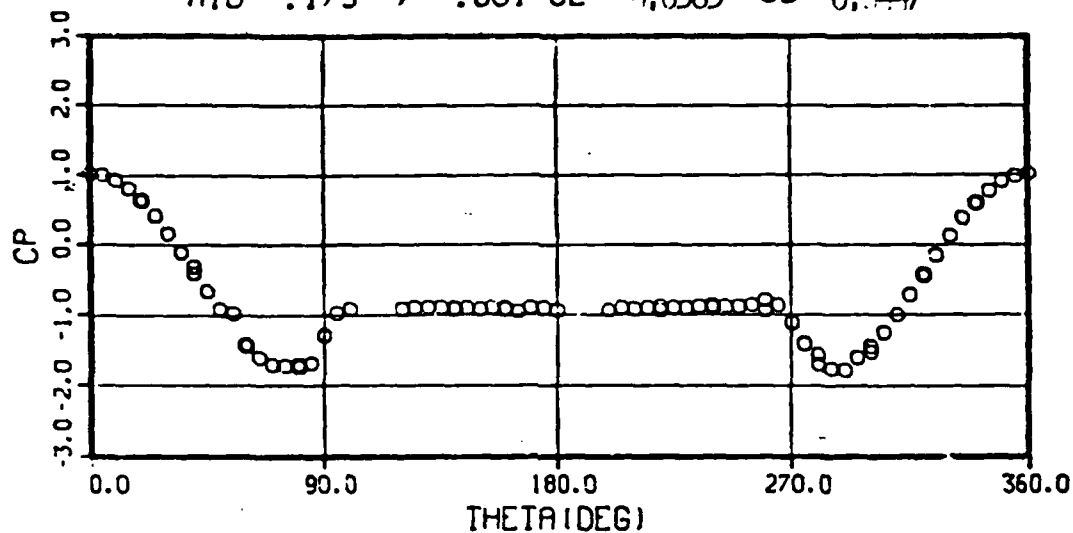
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 250 MESH SCREEN

RUN 214 OIU-160.4 +/- .92 RNDIU-4.405 +/- .011

PIU- 7656. +/- 4.00 VIU-196.65 +/- .648

MIU- .173 +/- .001 CL- -0.0583 CD- 0.9447



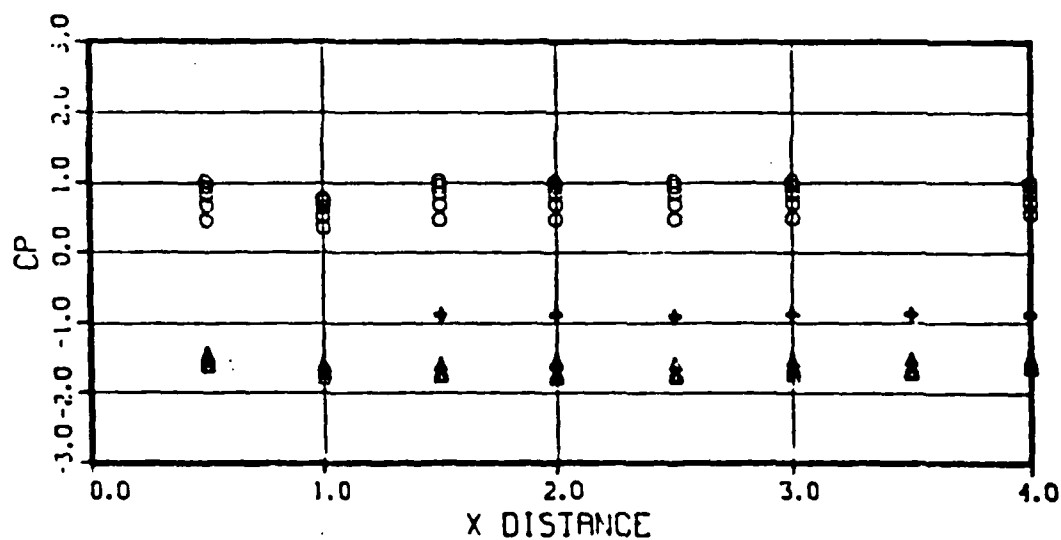
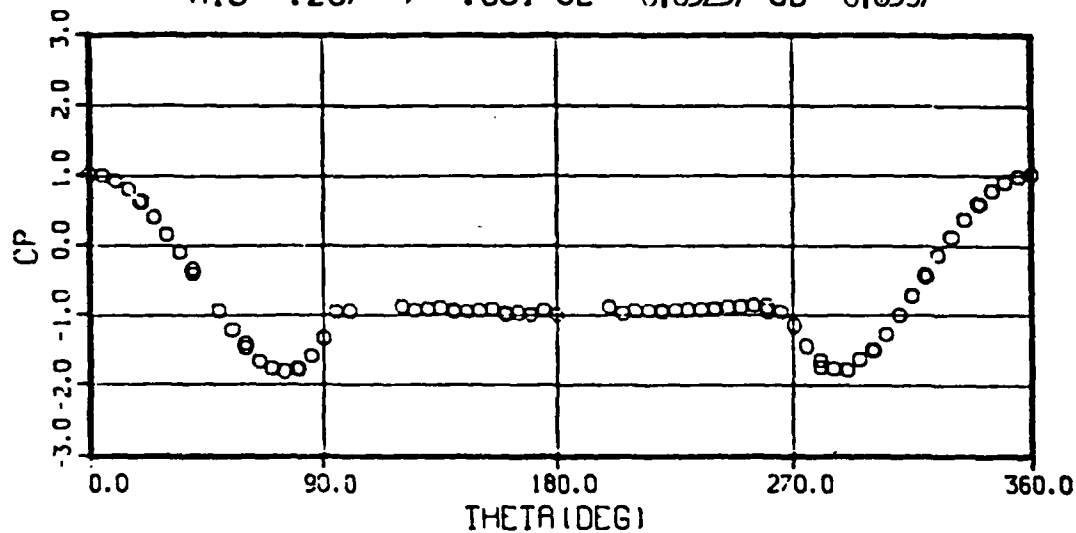
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER • NO. 250 MESH SCREEN

RUN 215 OIU-227.8 +/- .76 RNDIU-5.208 +/- .016

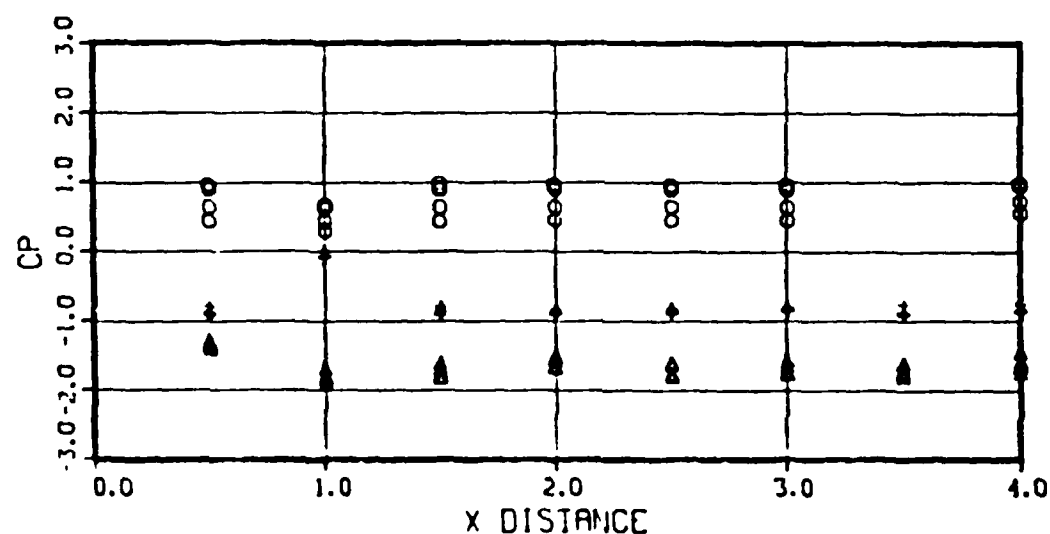
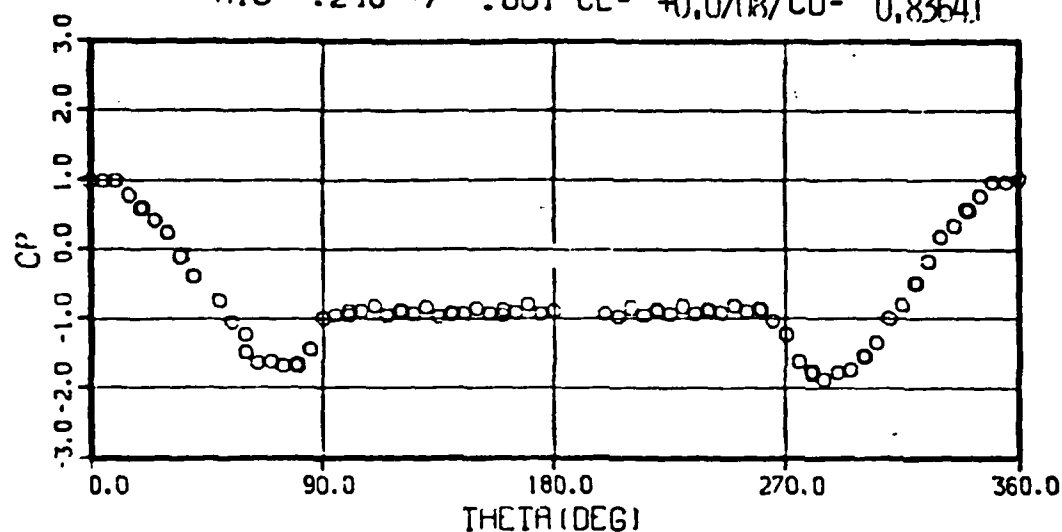
PIU- 7608. +/- 1.60 VIU-235.51 +/- .310

MIU- .207 +/- .001 CL- -0.05237 CD- 0.8597



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER - NO. 60 MESH SCREEN
 RUN 226 CIU- 21.8 +/- .62 RNDIU- .435 +/- .010
 PIU- 515. +/- 19.00 VIU-276.14 +/- .352
 MIU- .246 +/- .001 CL- +0.07087 CD- 0.83641



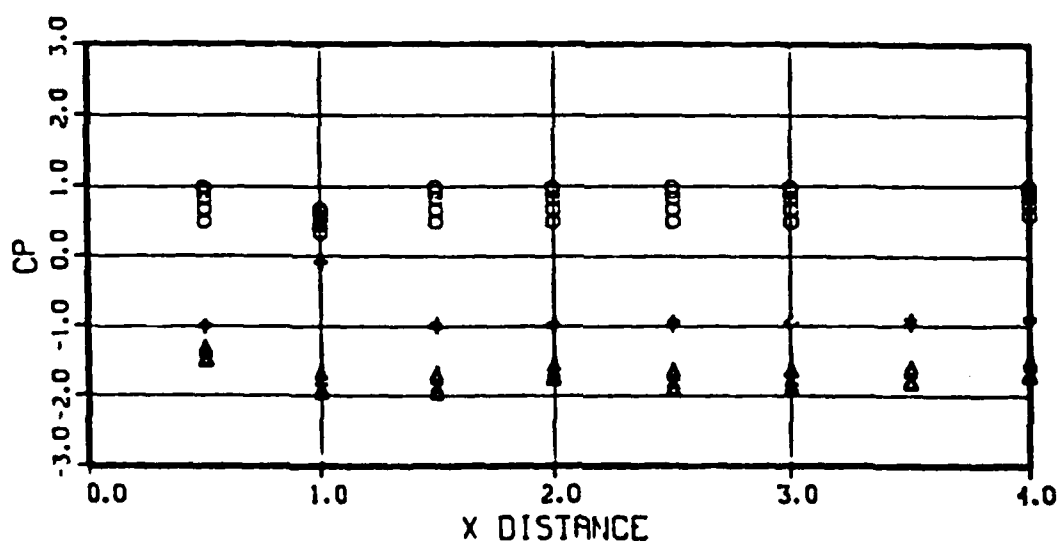
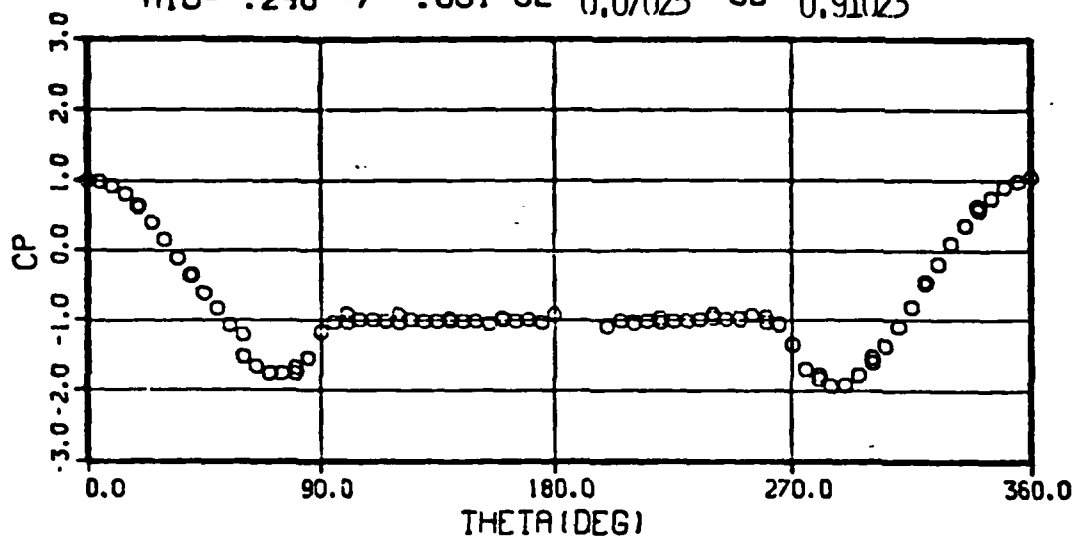
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 227 OIU- 25.9 +/- .14 RNDIU- .506 +/- .003

PIU- 603. +/- 4.20 VIU-279.26 +/- .536

MIU- .248 +/- .001 CL-0.07025 CD- 0.91023



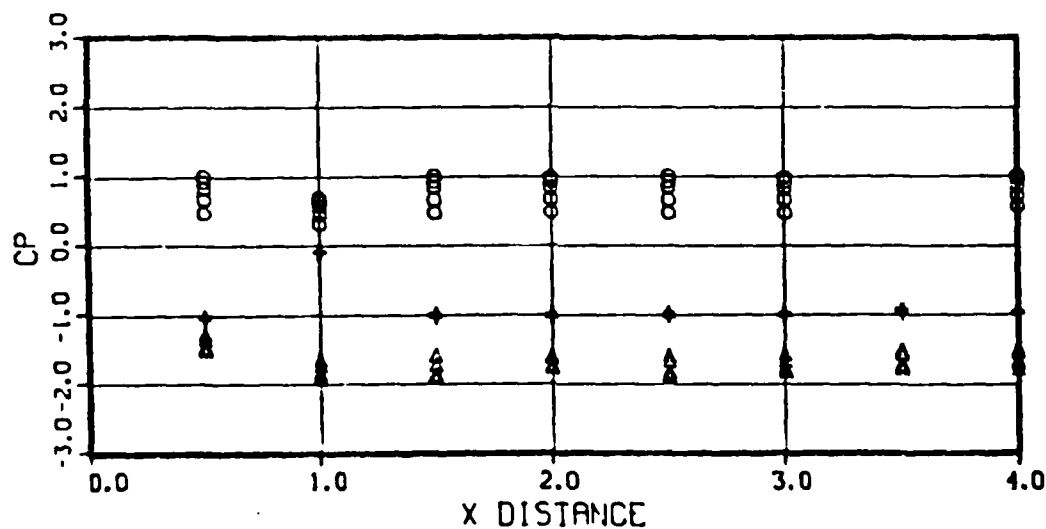
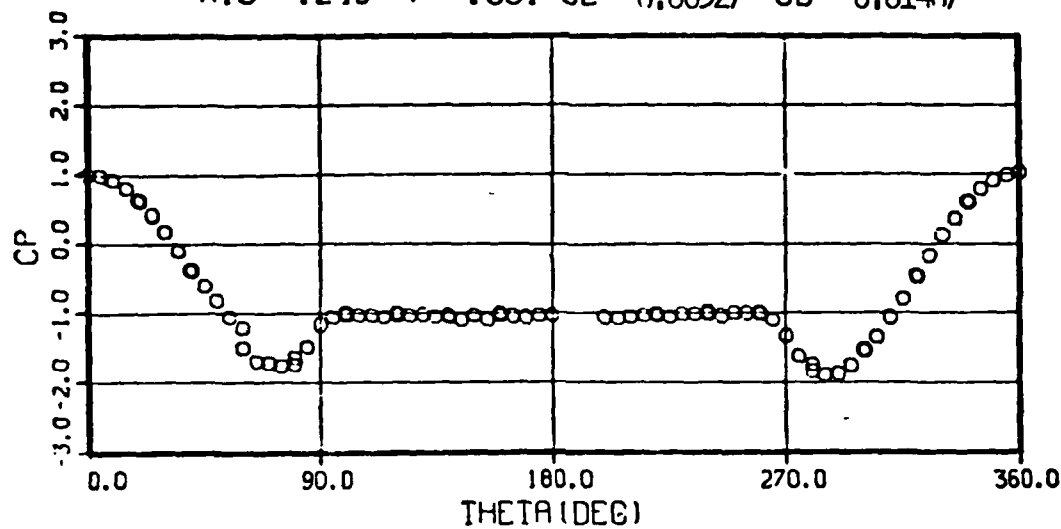
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 228 OIU- 32.0 +/- .22 RNDIU- .617 +/- .003

PIU- 736. +/- 3.80 VIU-282.04 +/- .848

MIU- .249 +/- .001 CL- 0.06327 CD- 0.81407



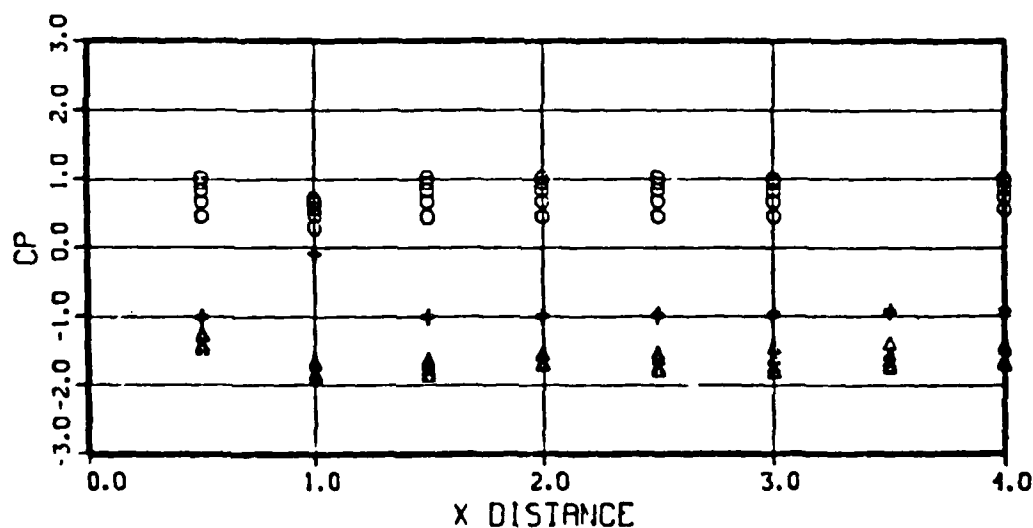
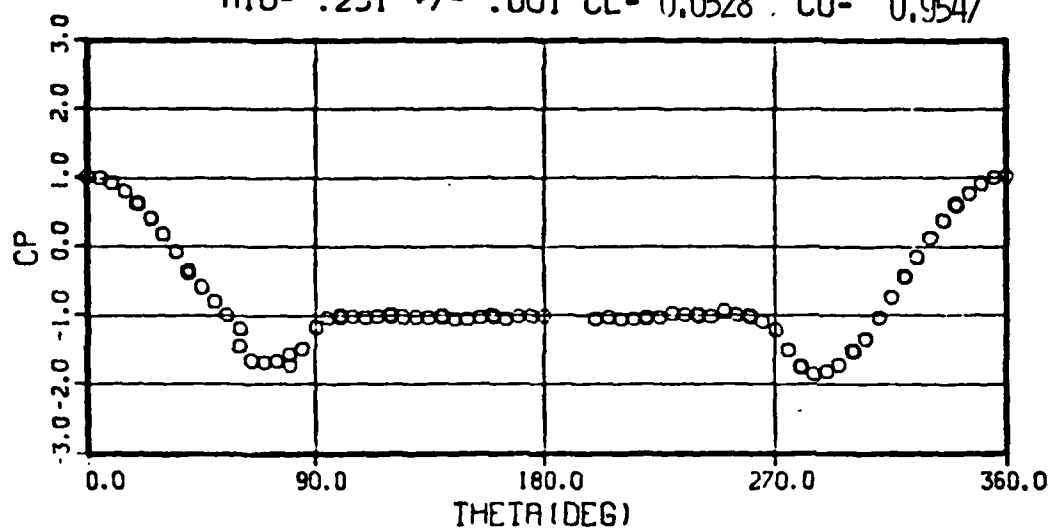
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-0 64 DEG-+ 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 229 OIU- 37.8 +/- .24 RNDIU- .722 +/- .003

PIU- 860. +/- 3.20 VIU-284.15 +/- .660

MIU- .251 +/- .001 CL- 0.0528 CD- 0.9547



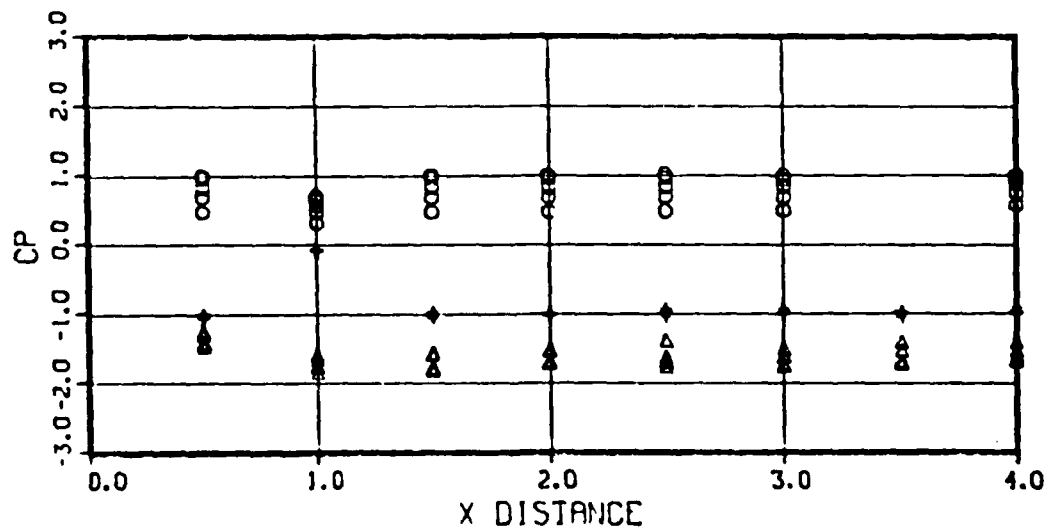
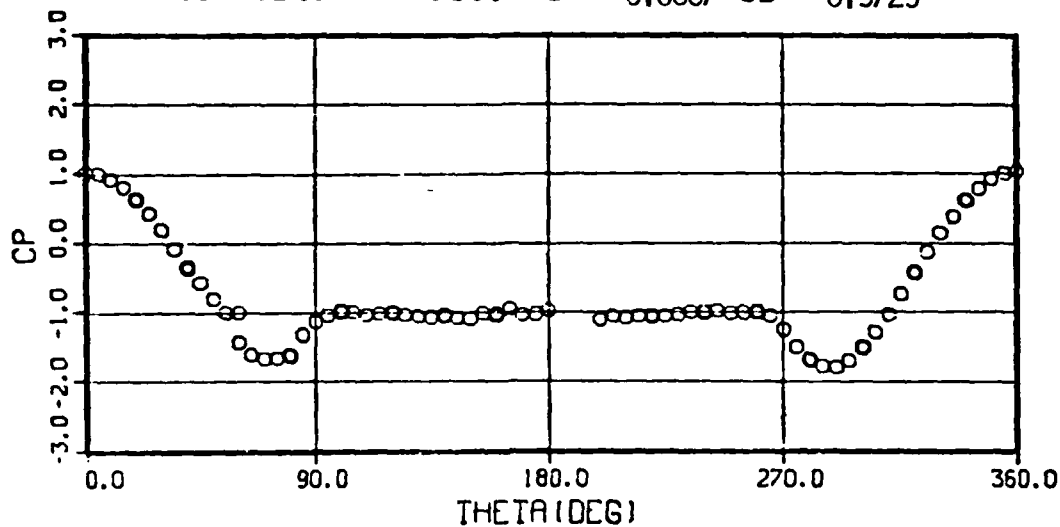
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 230 OIU- 43.3 +/- .34 RNDIU- .829 +/- .007

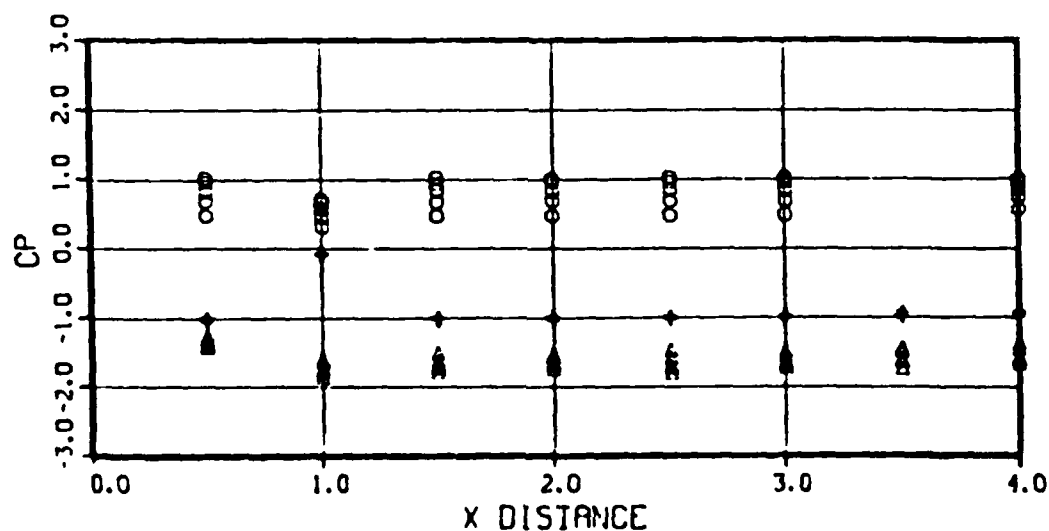
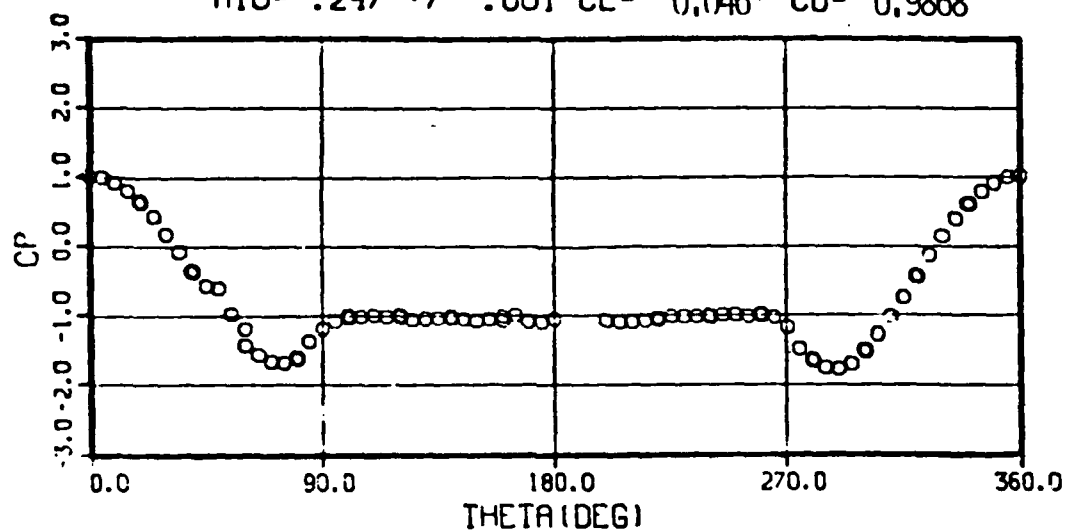
PIU- 997. +/- 9.40 VIU-282.59 +/- .808

MIU- .249 +/- .001 CL- 0.0607 CD- 0.9729



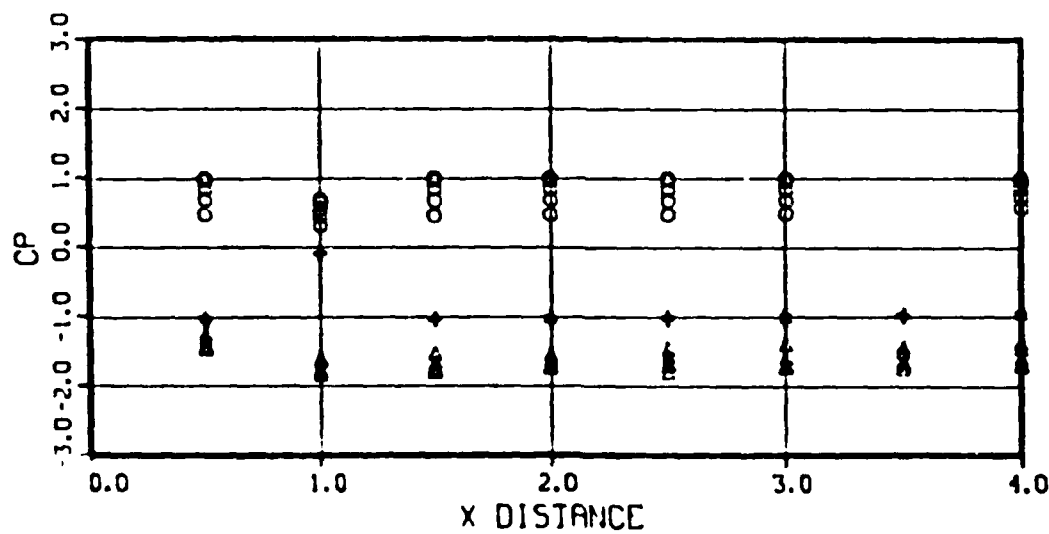
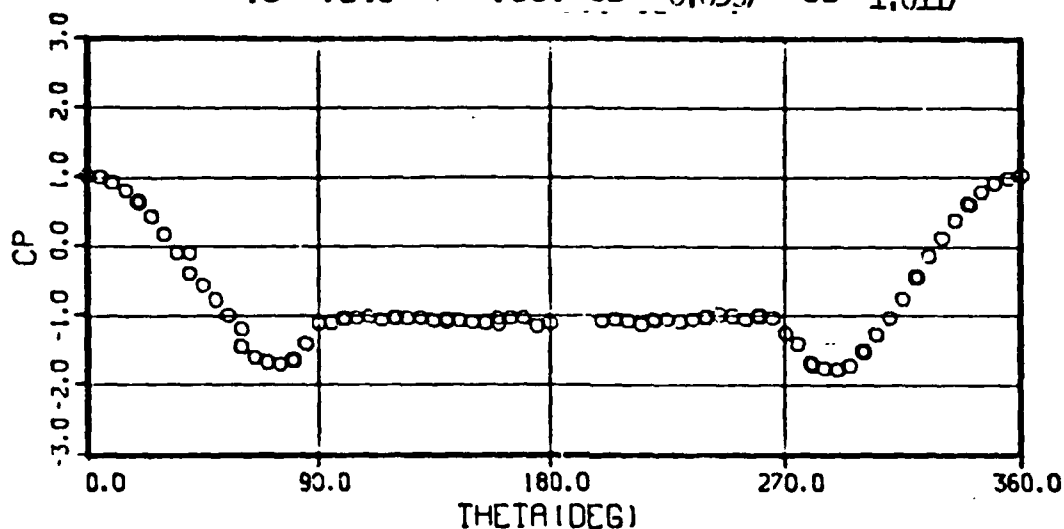
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 60 MESH SCREEN
 RUN 231 OIU- 48.0 +/- .10 RNDIU- .925 +/- .003
 PIU- 1118. +/- 3.20 VIU-281.04 +/- .512
 MIU- .247 +/- .001 CL- 0.046 CD- 0.9868



CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-- 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN
 RUN 232 CIU- 53.5 +/- .16 RNDIU-1.027 +/- .003
 PIU- 1241. +/- 3.40 VIU-281.62 +/- .712
 MIU- .248 +/- .001 CL- 0.0597 CD-1.0117



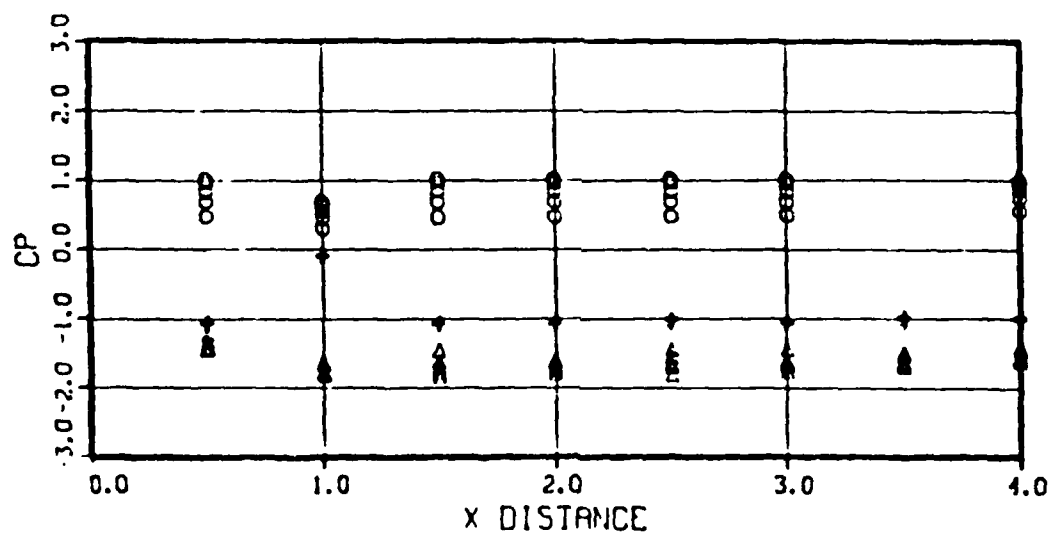
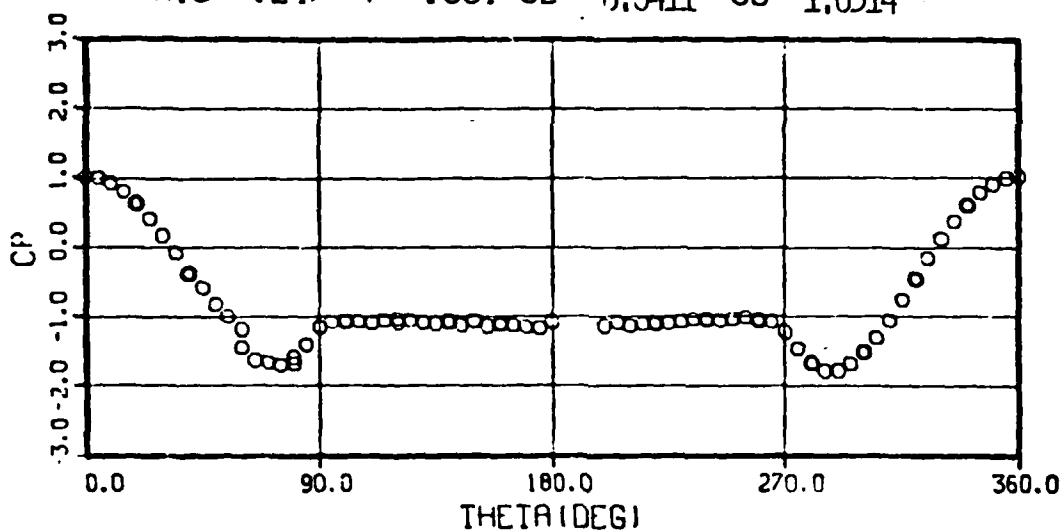
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 233 OIU- 66.5 +/- .26 RNDIU-1.277 +/- .002

PIU- 1553. +/- 2.60 VIU-281.32 +/- .748

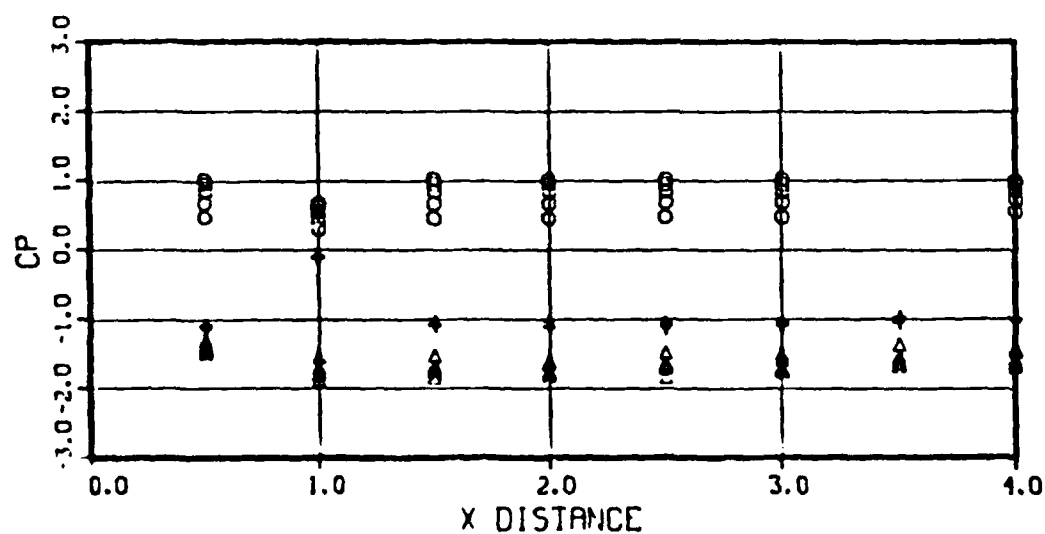
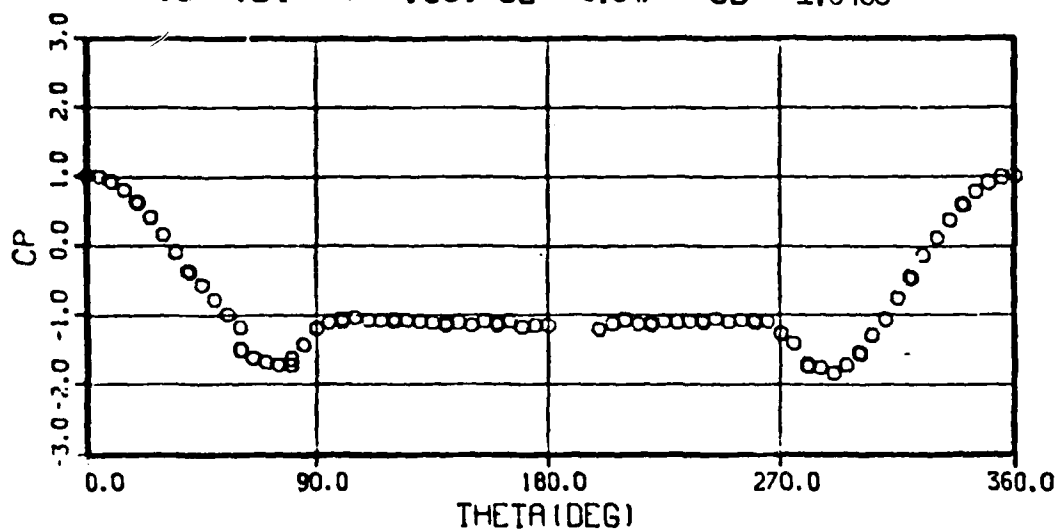
MIU- .247 +/- .001 CL- 0.9411 CD- 1.0314



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 234 OIU- 79.7 +/- .60 RNDIU-1.530 +/- .009
 PIU- 1869. +/- 5.40 VIU-280.82 +/- .958
 MIL- .247 +/- .001 CL- 0.047 CD- 1.0468



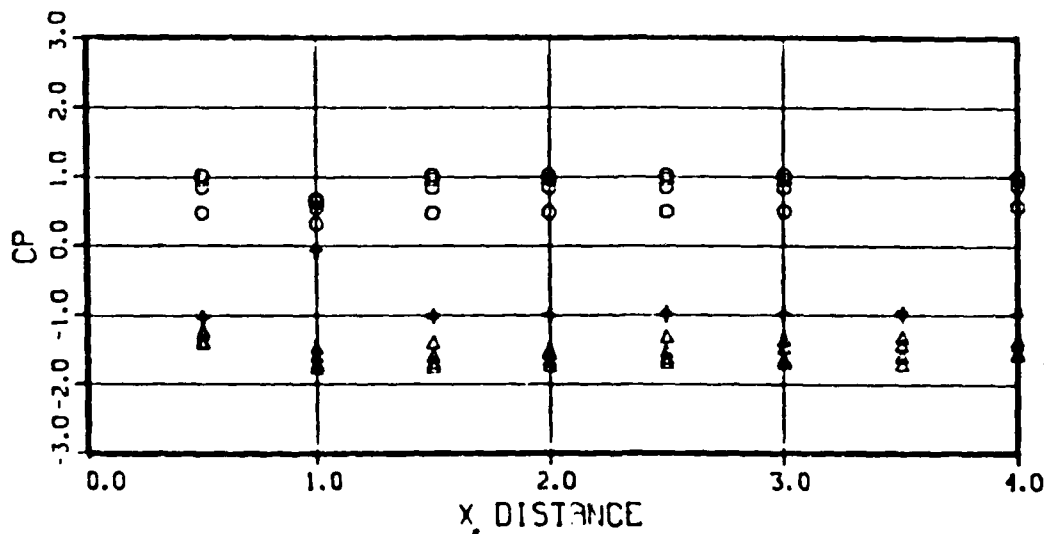
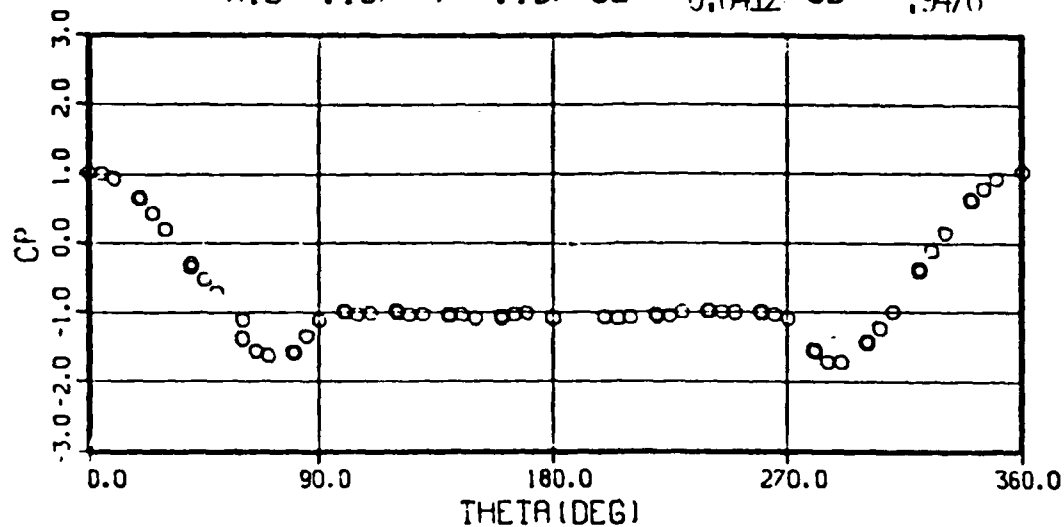
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 235 OIU- 74.7 +/- 74.74 RNDIU-1.432 +/-*****

PIU- 1756. +/- 1755.60 VIU-224.71 +/- *****

MIU- .197 +/- .197 CL- 0.0412 CD- .9476



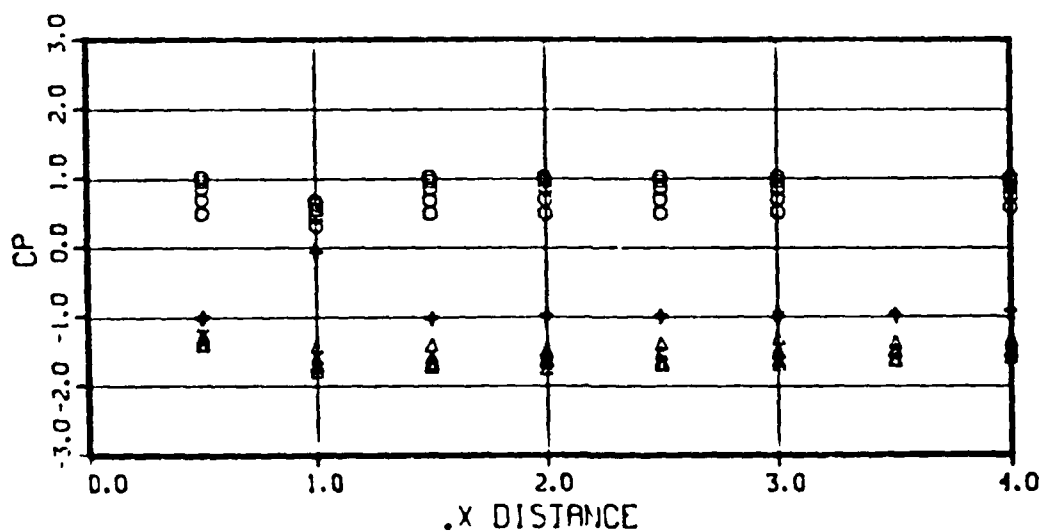
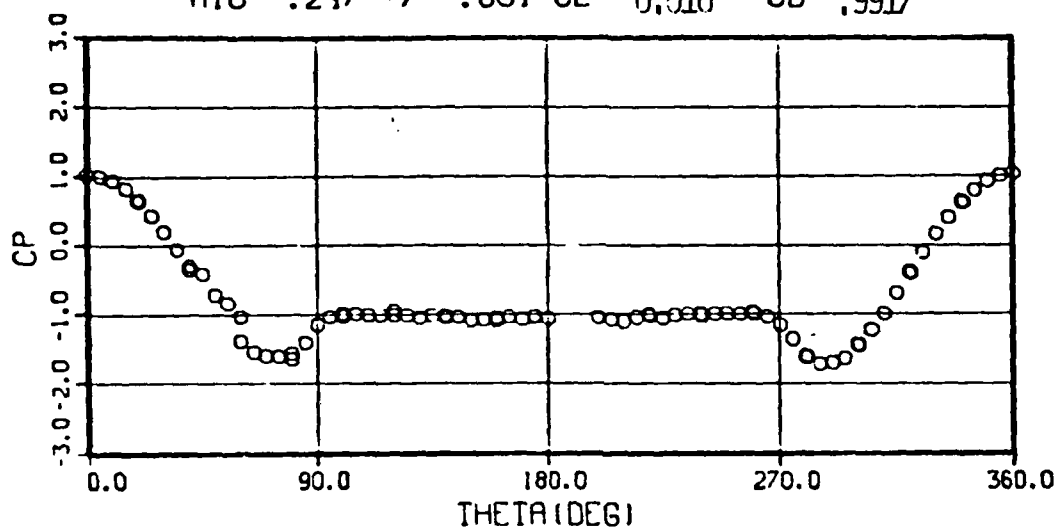
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 60 MESH SCREEN

RUN 236 OIU-108.0 +/- .52 RNDIU-2.056 +/- .004

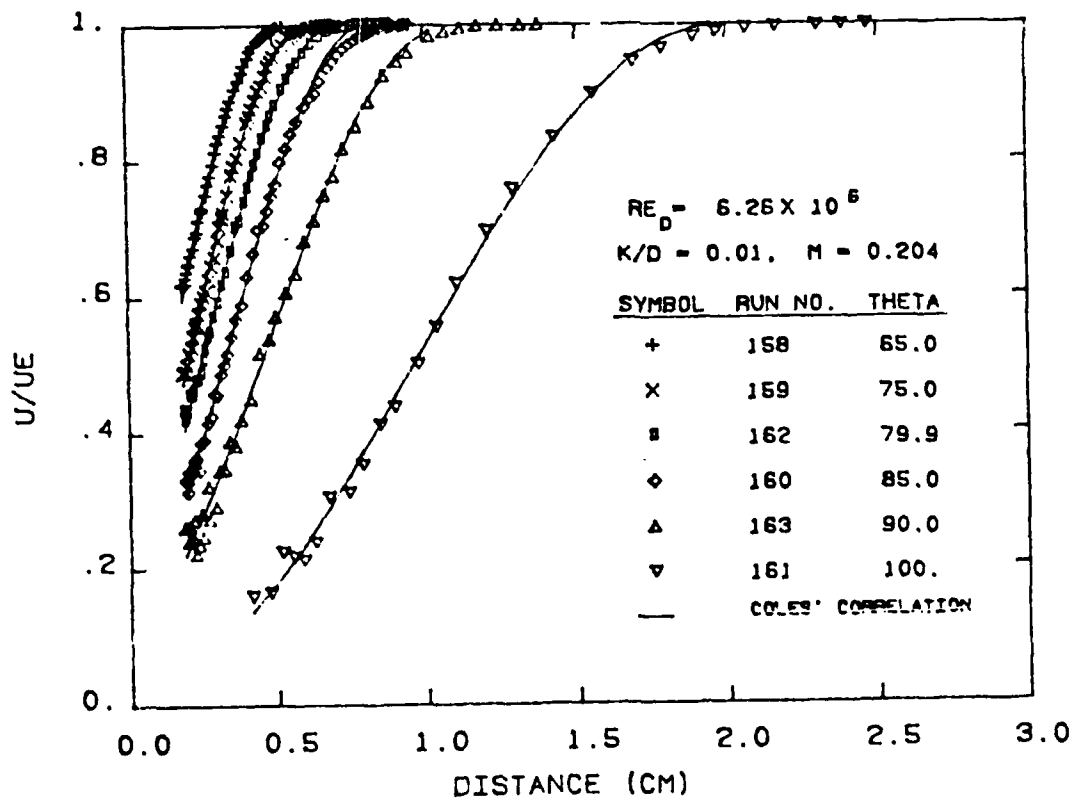
PIU- 2519. +/- 6.00 VIU-282.16 +/- .782

MIU- .247 +/- .001 CL- 0.016 CD- .9917

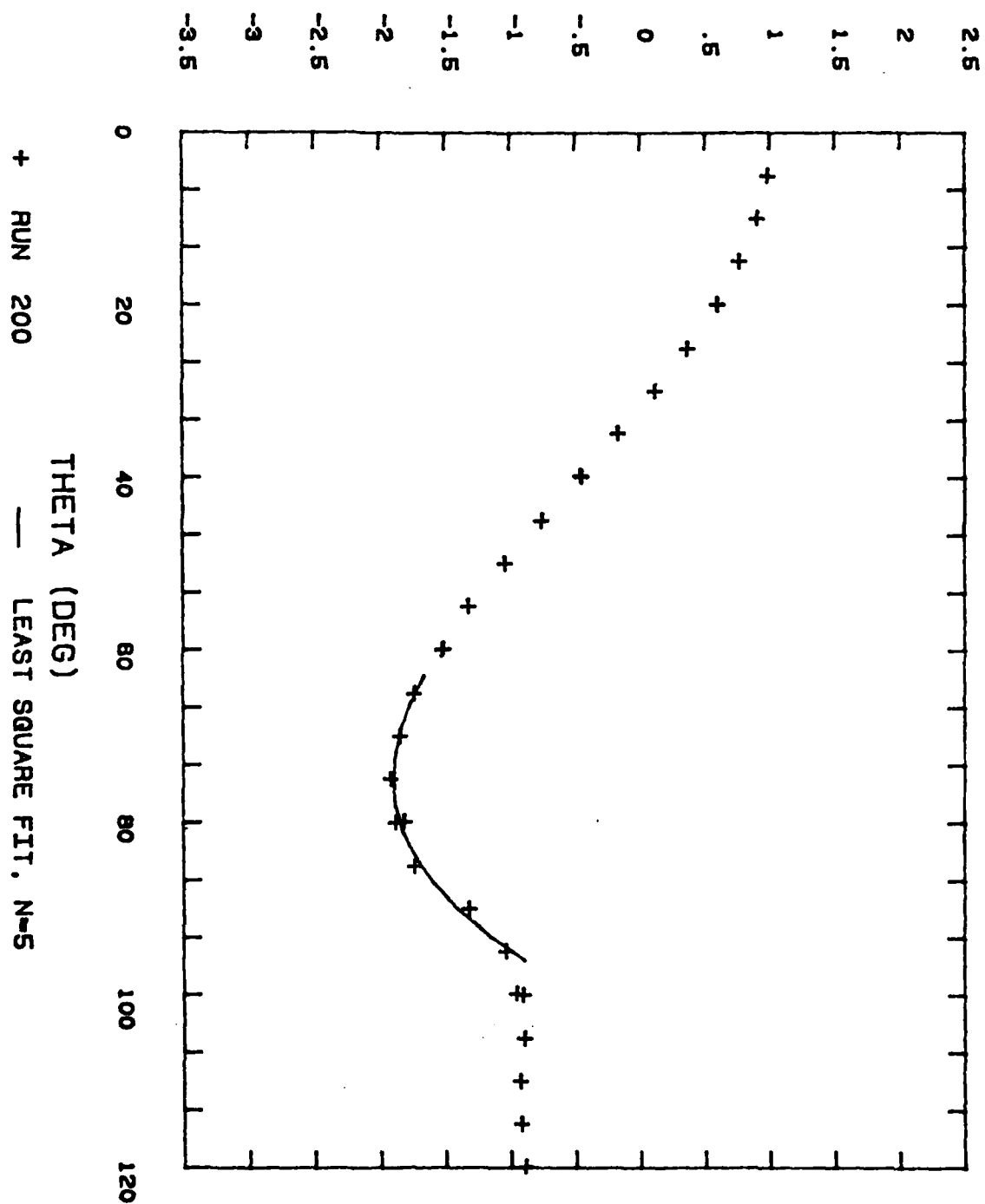


CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-* 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

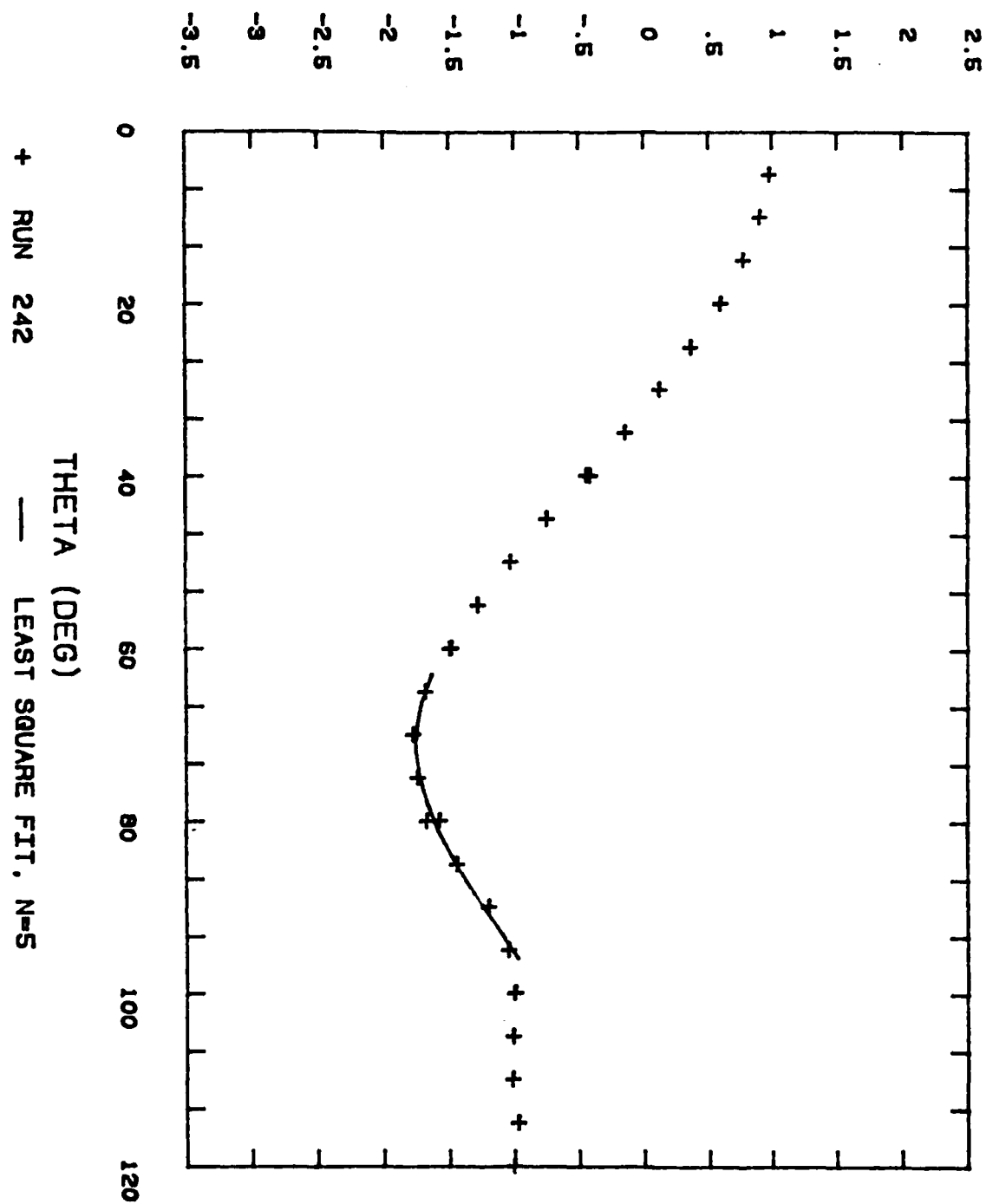
PRI	6.500E+01	7.500E+01	7.999E+01	8.501E+01	9.005E+01	1.002E+02
RUN	158	159	162	160	163	161
RE	6.279E+06	6.243E+06	6.234E+06	6.175E+06	6.298E+06	6.277E+06
M	2.039E-01	2.047E-01	2.047E-01	2.045E-01	2.042E-01	2.043E-01
K/D	1.000E-02	1.000E-02	1.000E-02	1.000E-02	1.000E-02	1.000E-02
UI	7.109E+01	7.148E+01	7.187E+01	7.153E+01	7.167E+01	7.166E+01
UE	1.089E+02	1.126E+02	1.131E+02	1.097E+02	1.073E+02	1.046E+02
NU	3.580E-06	3.620E-06	3.650E-06	3.670E-06	3.600E-06	3.610E-06
RESID	6.800E-03	7.100E-03	8.200E-03	1.010E-02	1.860E-02	1.550E-02
YMIN	1.836E-01	1.862E-01	1.887E-01	1.913E-01	1.887E-01	4.173E-01
YMAX	3.866E-01	4.630E-01	5.494E-01	6.256E-01	8.237E-01	1.560E+00
PI	3.978E-01	1.072E+00	1.486E+00	2.828E+00	4.141E+00	3.583E+01
DU*	2.133E+01	2.056E+01	2.014E+01	1.915E+01	1.846E+01	1.390E+01
K+	1.040E+04	7.580E+03	6.380E+03	4.250E+03	3.210E+03	4.940E+02
DELTA	4.894E-01	5.894E-01	6.868E-01	8.005E-01	1.069E+00	1.973E+00
CF	5.500E-02	2.950E-02	2.100E-02	9.500E-03	5.200E-03	1.000E-04
U*	1.179E+01	8.679E+00	7.356E+00	4.924E+00	3.649E+00	5.640E-01
DEL*	8.540E-02	1.331E-01	1.734E-01	2.390E-01	3.586E-01	7.418E-01
THETA	5.950E-02	8.050E-02	9.820E-02	1.191E-01	1.591E-01	2.676E-01
B	1.436E+00	1.653E+00	1.766E+00	2.007E+00	2.254E+00	2.772E+00
RTHETA	1.810E+04	2.500E+04	3.040E+04	3.570E+04	4.740E+04	7.750E+04
BETA	-1.288E-01	1.022E-01	4.681E-01	1.969E+00	6.014E+00	3.954E+02

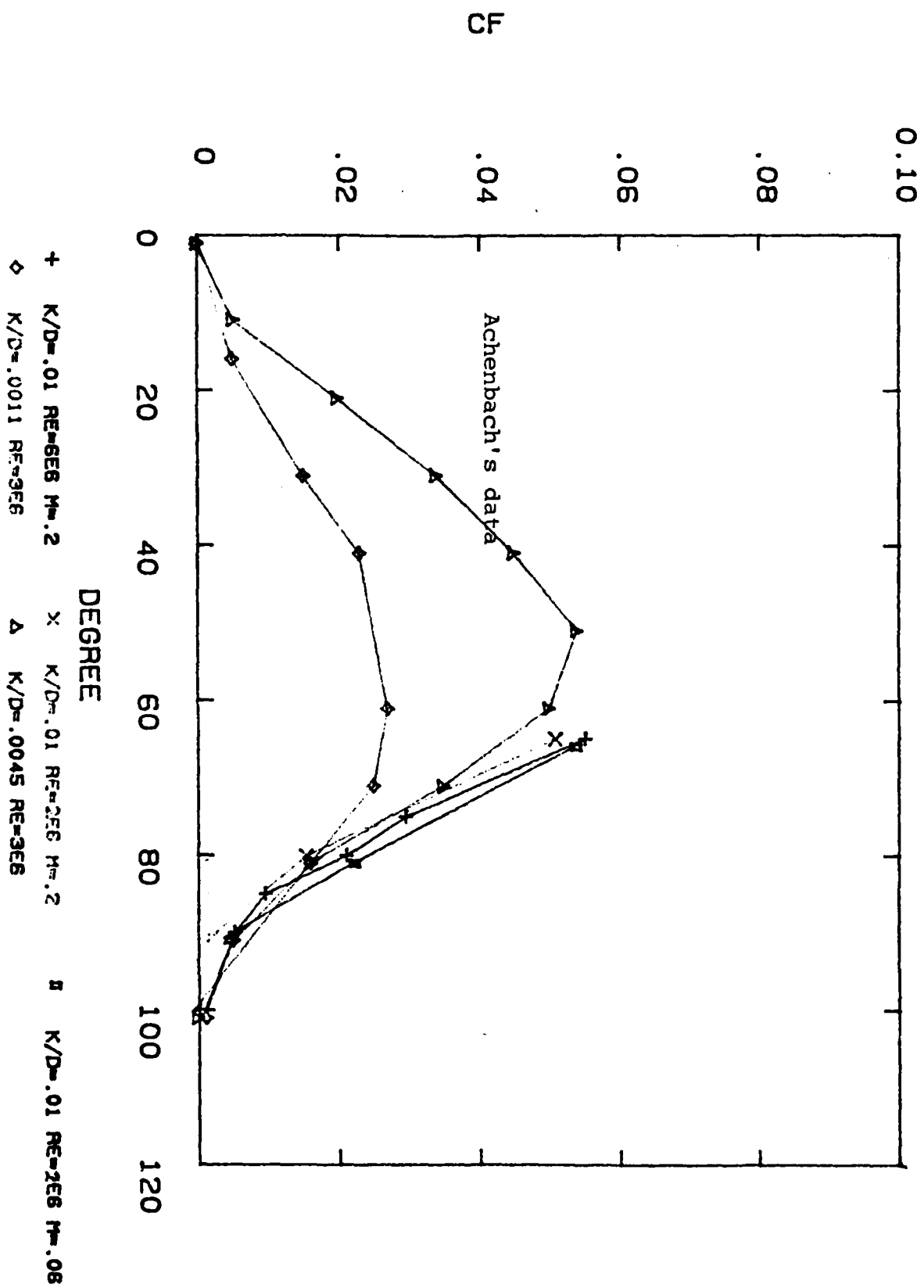


CP1U



CP1U





PART II

BOUNDARY LAYER PROFILES

Part II consists of plots and analysis of boundary layer profiles performed by PRi. Data analysis on the boundary layer profiles consists of determining the applicability of conventional similarity laws to smooth and rough cylinder turbulent boundary layers. This is accomplished by casting the data in terms of the law-of-the-wall and law-of-the-wake similarity laws.

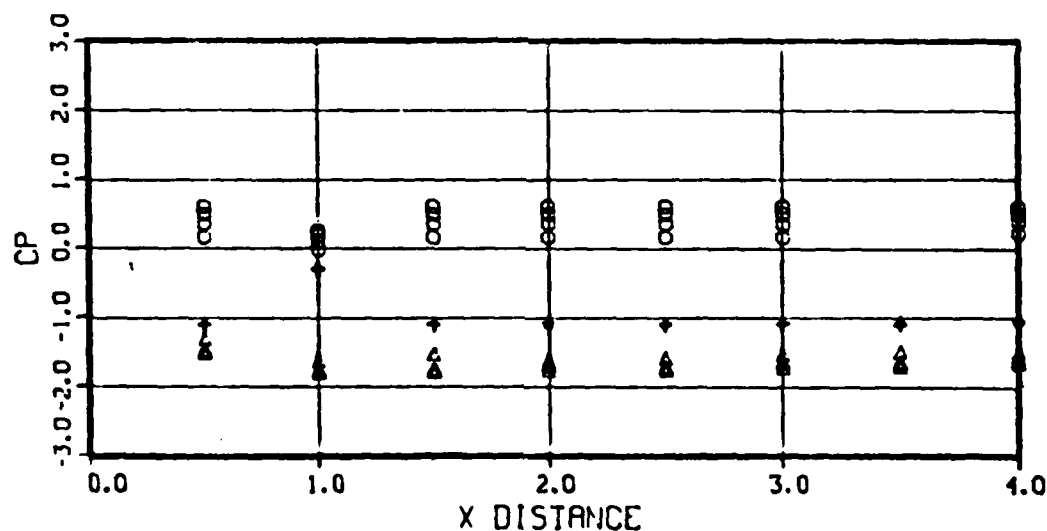
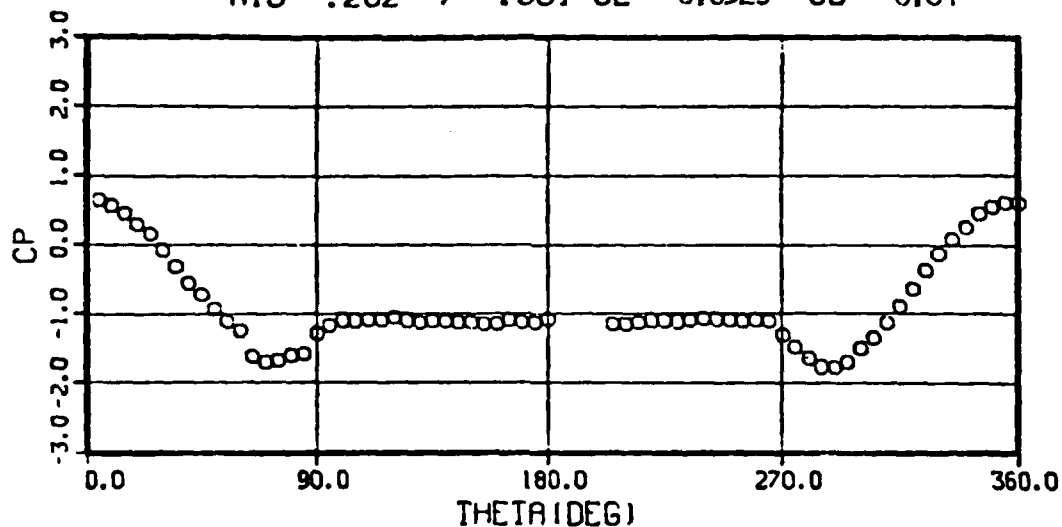
APPENDIX C
BOUNDARY LAYER PROFILES
AND DATA

CYLINDER + NO. 60 MESH SCREEN

RUN 244 OIU-270.8 +/- 1.00 RNDIU-5.991 +/- .015

PIU- 9426. +/- 20.50 VIU-235.63 +/- .500

MIU- .202 +/- .001 CL- 0.0329 CD- 0.84



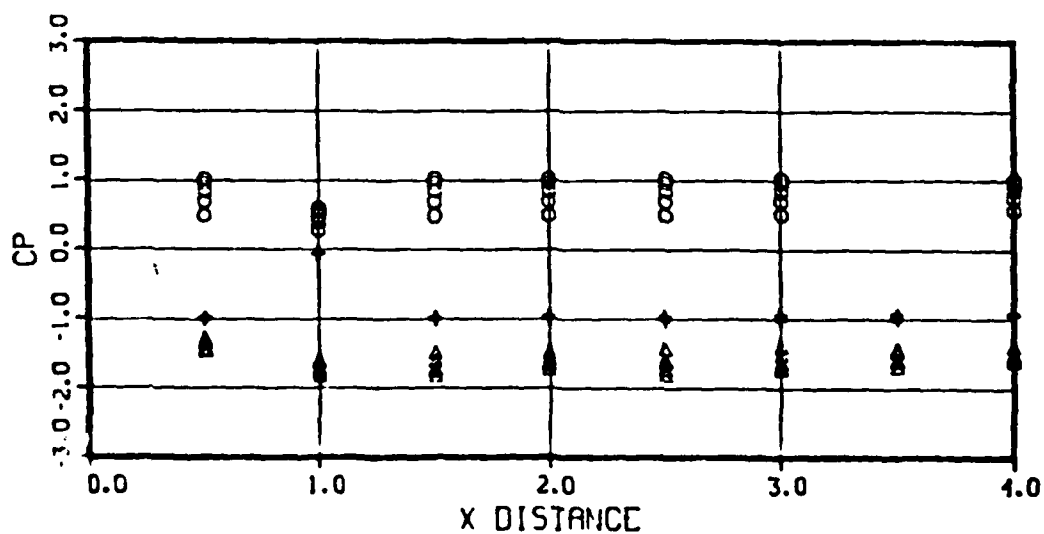
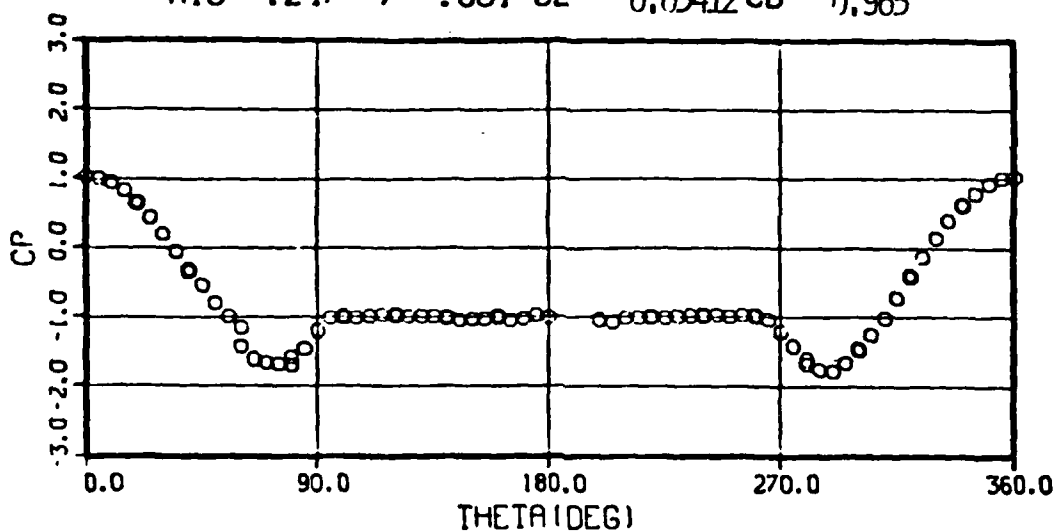
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 243 OIU-405.0 +/- 2.16 RNDIU-7.297 +/- .034

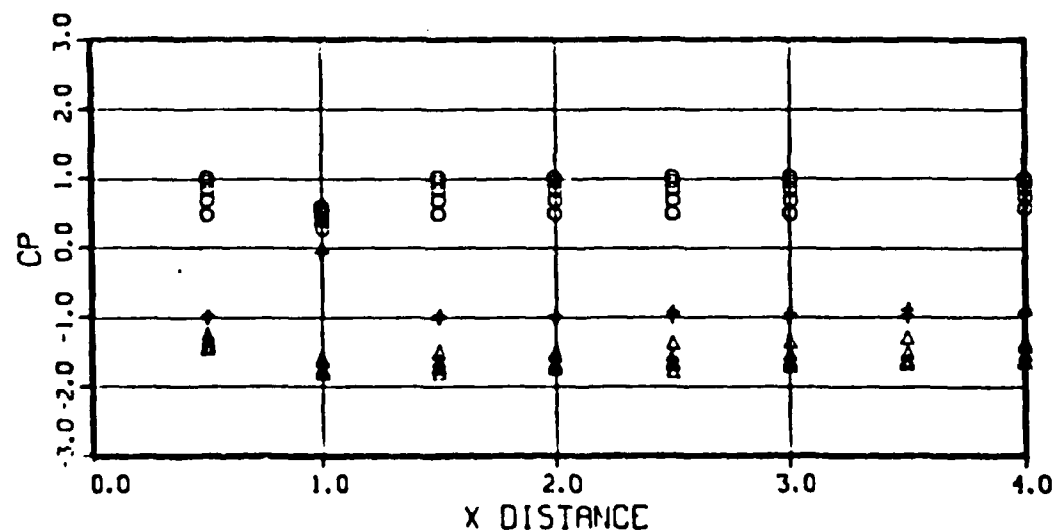
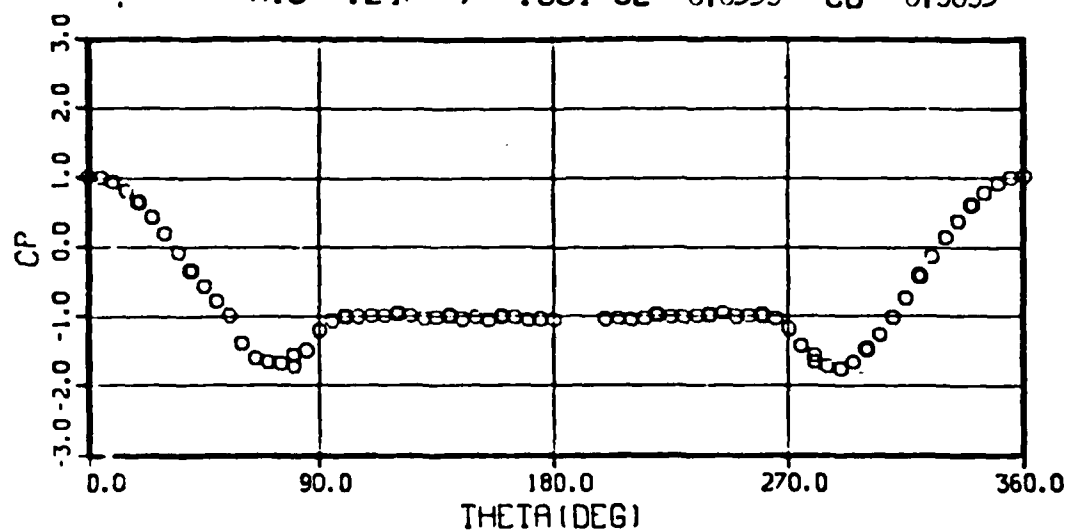
PIU- 9440. +/- 12.40 VIU-288.51 +/- .794

MIU- .247 +/- .001 CL- 0.03412 CD- 0.965



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN
 RUN 242 OIU-334.3 +/- 2.62 RNDIU-6.121 +/- .025
 PIU- 7827. +/- 4.00 VIU-285.29 +/- 1.118
 MIU- .247 +/- .001 CL- 0.0359 CO- 0.9693



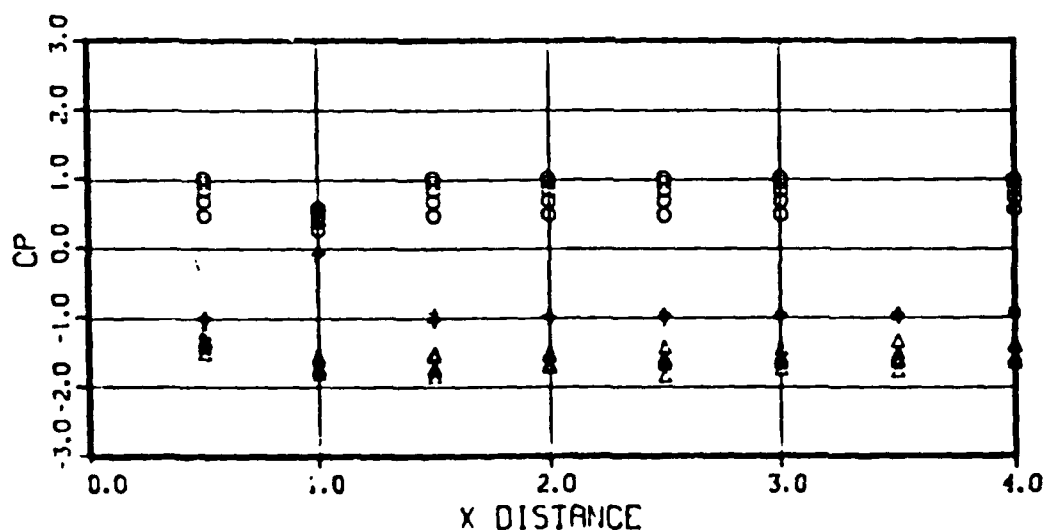
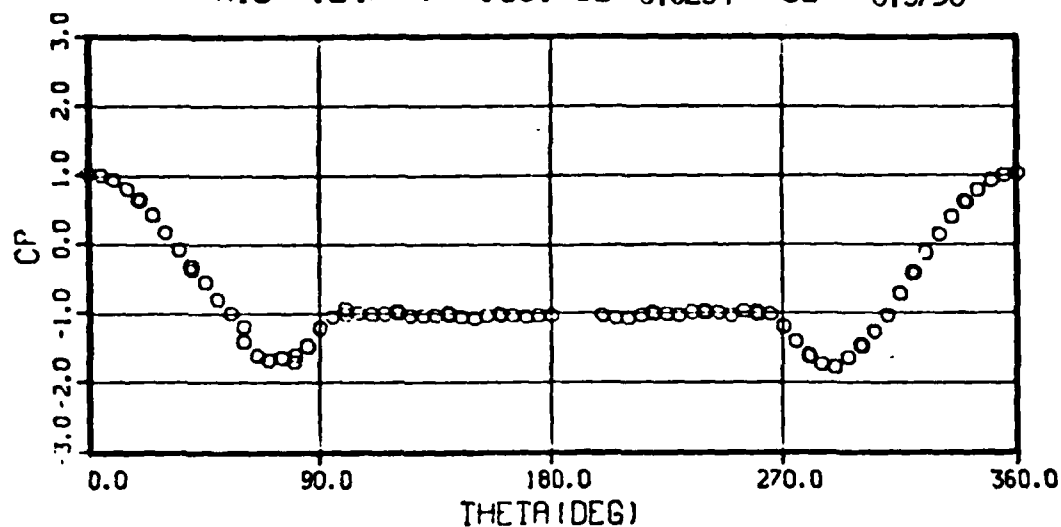
CP VALUES ALONG LONGITUDINAL RAYS AT
 POLAR ANGLE OF 4DEG-0 64DEG-- 124DEG-X.
 THE 5 SETS OF POINTS AT EACH LOCATION
 CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER * NO. 60 MESH SCREEN

RUN 241 OIU-275.2 +/- 2.48 RNDIU-5.097 +/- .030

PIU- 6454. +/- 14.20 VIU-284.81 +/- .946

MIU- .247 +/- .001 CL-0.0294 CD- 0.9736



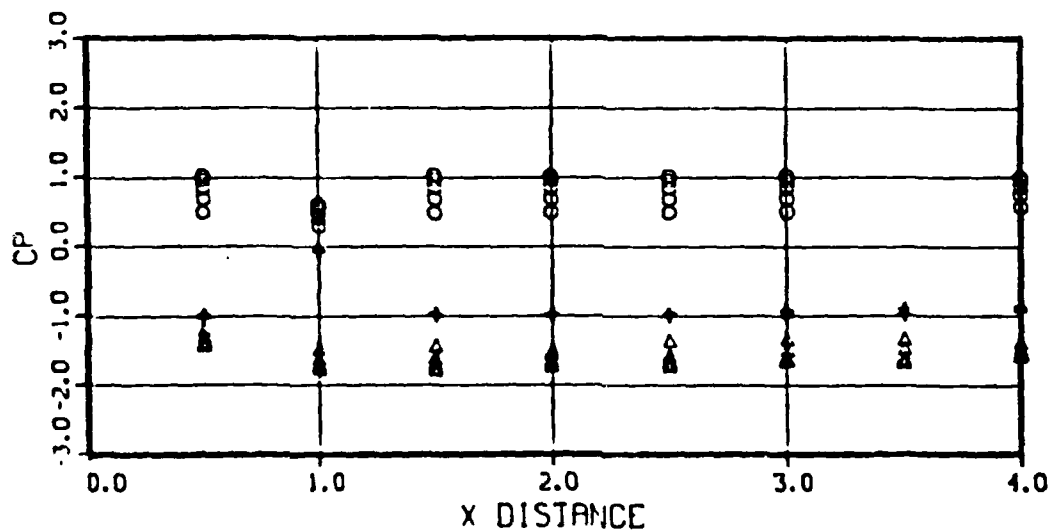
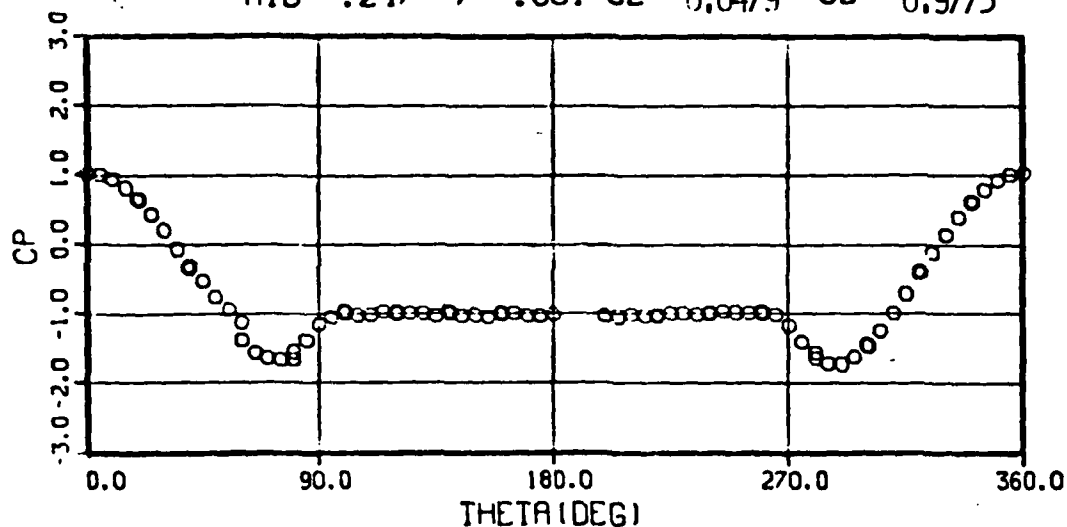
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 40 DEG-O 64 DEG-* 124 DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 240 OIU-220.1 +/- 2.02 RNDIU-4.114 +/- .016

PIU- 5155. +/- 4.40 VIU-283.91 +/- 1.424

MIU- .247 +/- .001 CL- 0.0479 CD- 0.9773



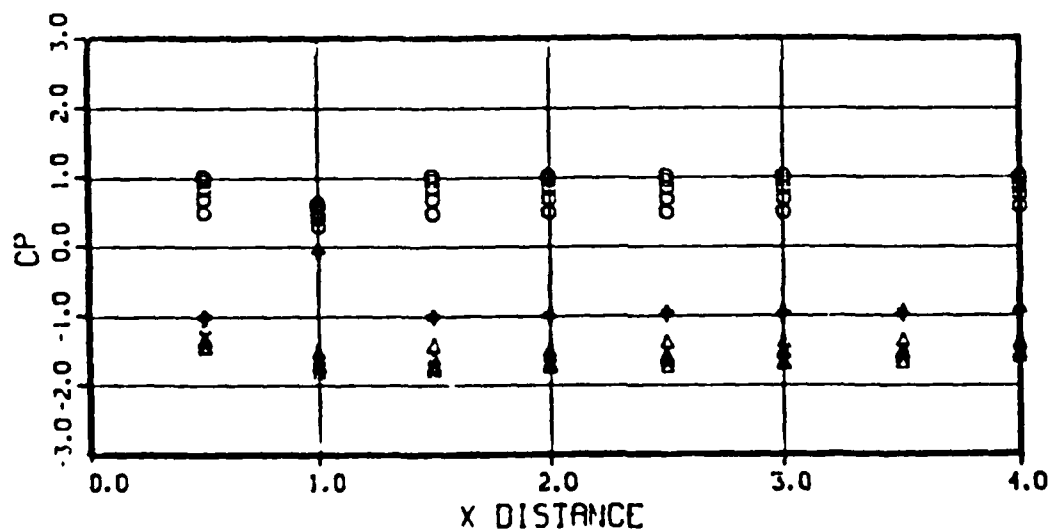
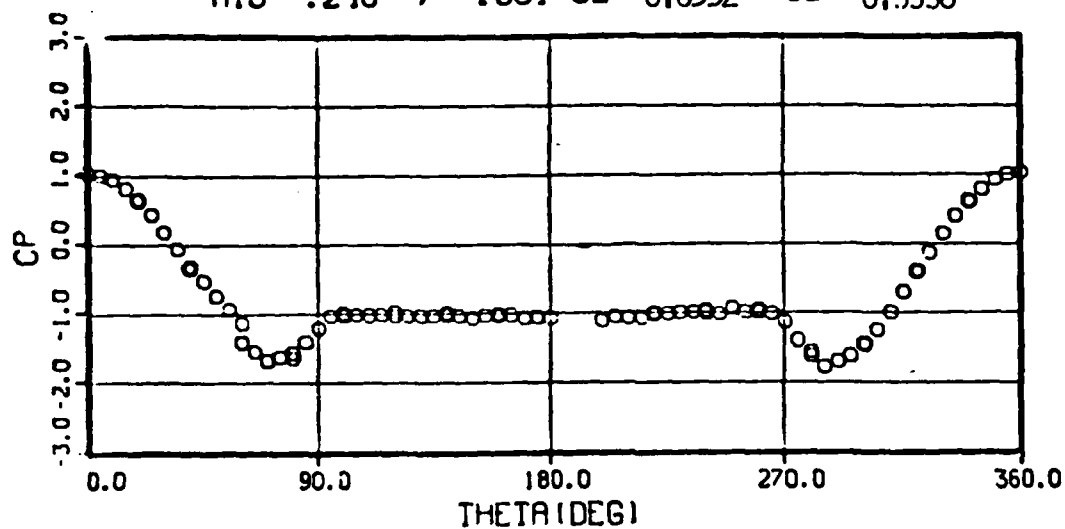
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 239 OIU-191.0 +/- 1.42 RNDIU-3.595 +/- .016

PIU- 4484. +/- 8.80 VIU-282.92 +/- .936

MIU- .246 +/- .001 CL- 0.0352 CD- 0.9998



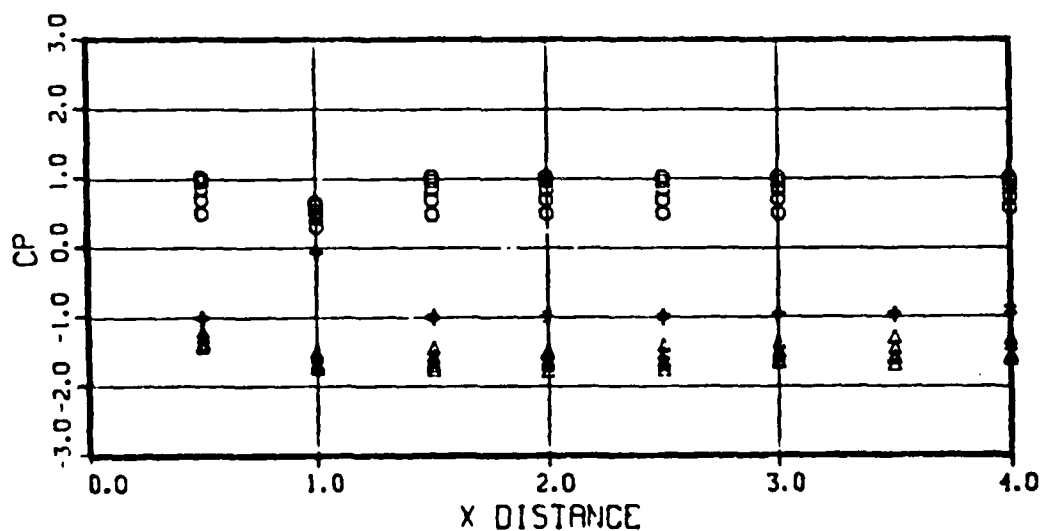
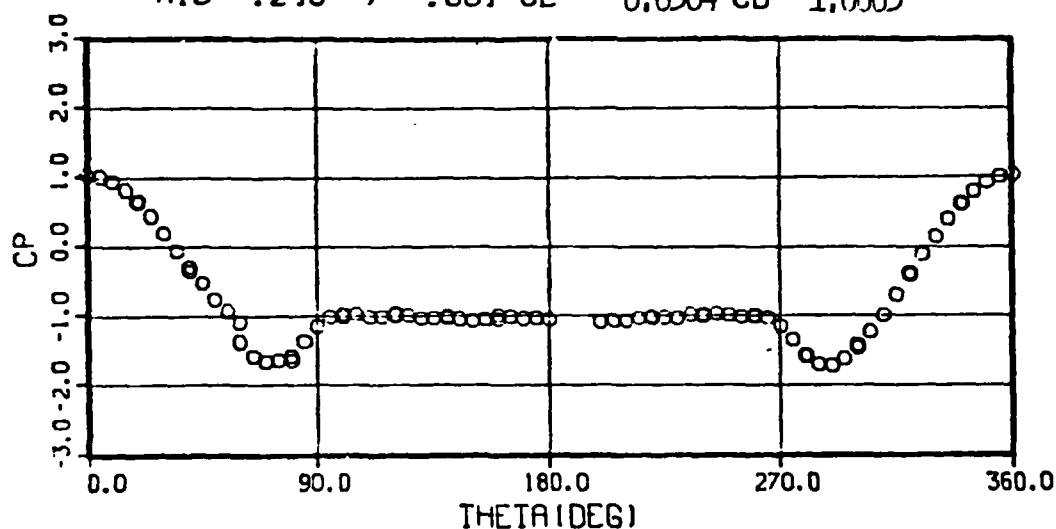
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

RUN 238 OIU-164.2 +/- 1.36 RNDIU-3.089 +/- .013

PIU- 3818. +/- 4.60 VIU-283.77 +/- 1.178

MIU- .248 +/- .001 CL- -0.0364 CD- 1.0003



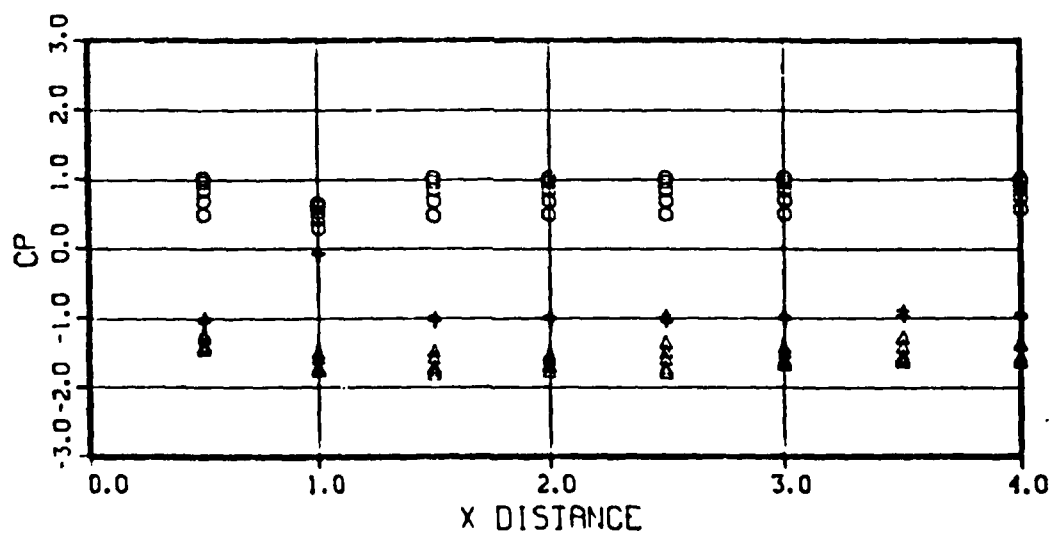
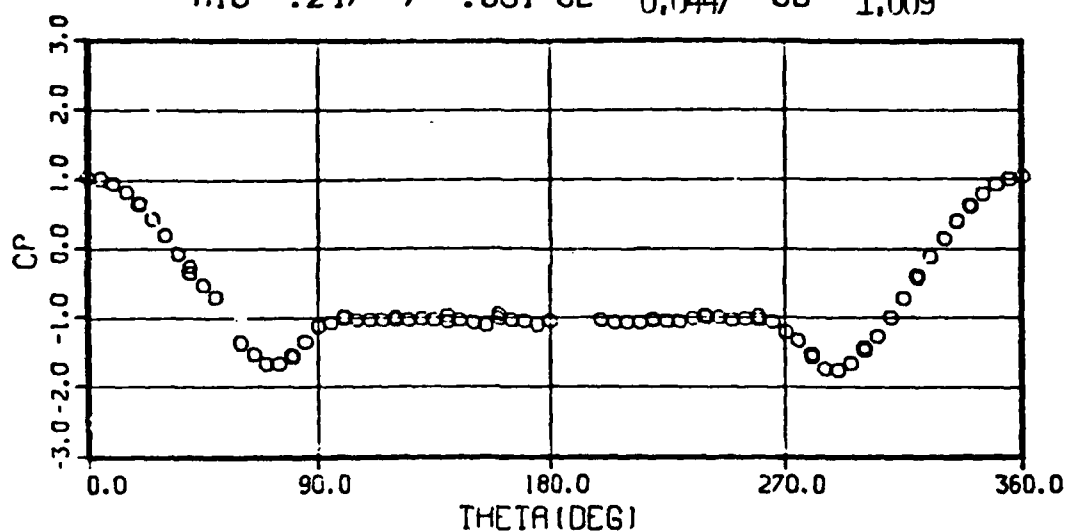
CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.

CYLINDER + NO. 60 MESH SCREEN

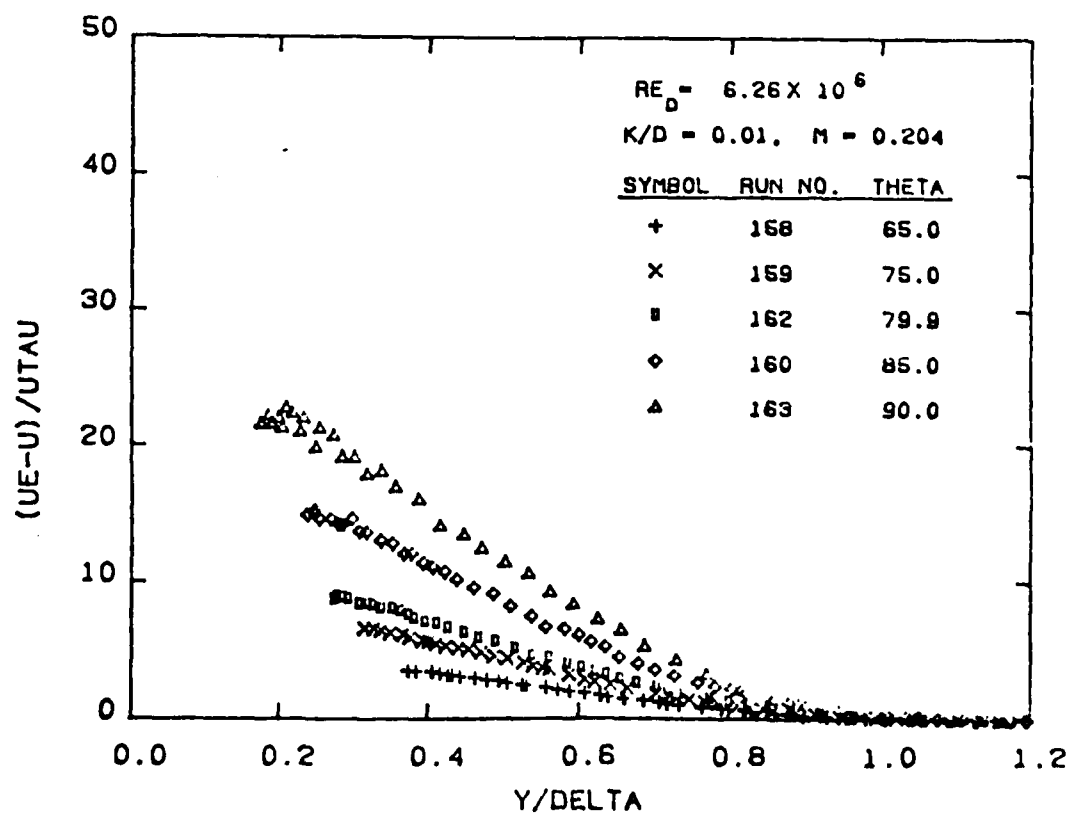
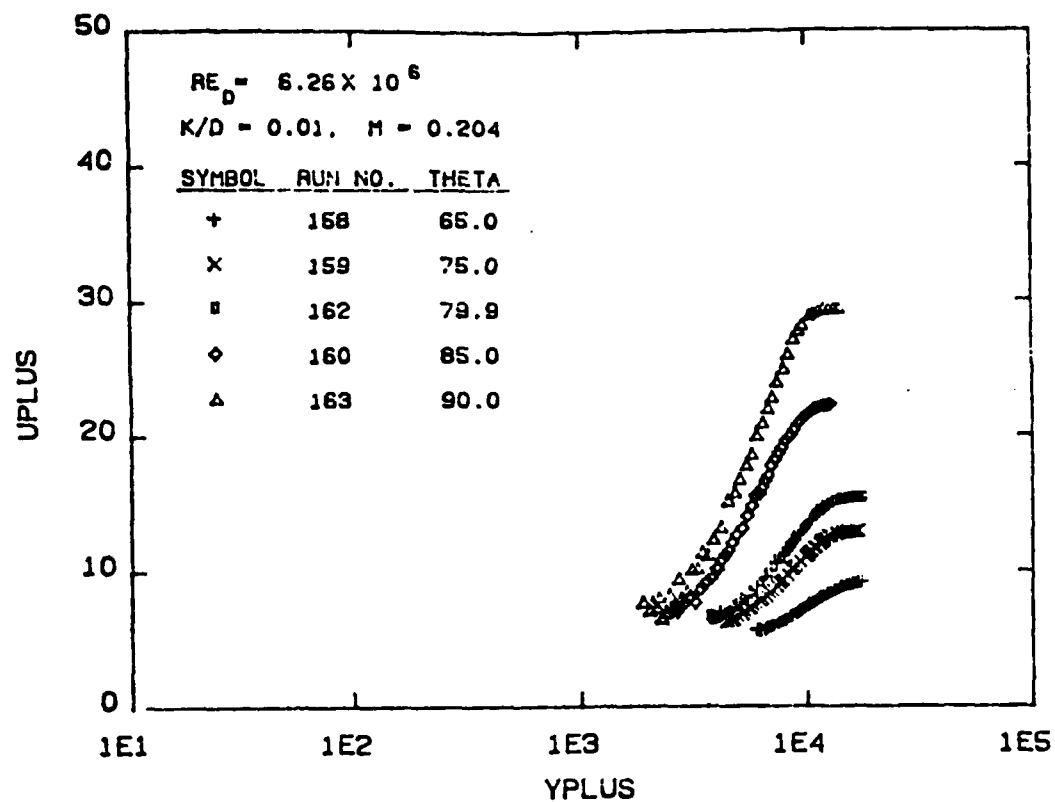
RUN 237 OIU-135.8 +/- .94 RNDIU-2.580 +/- .015

PIU- 3185. +/- 18.60 VIU-281.94 +/- 1.812

MIU- .247 +/- .001 CL- 0.0447 CD- 1.009



CP VALUES ALONG LONGITUDINAL RAYS AT
POLAR ANGLE OF 4DEG-0 64DEG-+ 124DEG-X.
THE 5 SETS OF POINTS AT EACH LOCATION
CORRESPOND TO 4 ROLLS OF 5 DEG. EACH.



MON 158

Y(CN)	D/DE	Y+	D+	Y/DELTA	DEDF
0.184	0.619	6047.46	5.718	0.375	3.513
0.189	0.618	6214.75	5.707	0.386	3.524
0.199	0.621	6549.33	5.736	0.406	3.497
0.199	0.629	6549.33	5.810	0.406	3.423
0.204	0.638	6716.62	5.893	0.417	3.341
0.209	0.648	6883.90	5.984	0.427	3.250
0.217	0.650	6967.55	6.001	0.432	3.232
0.217	0.662	7134.84	6.111	0.443	3.123
0.227	0.673	7469.41	6.215	0.463	3.019
0.234	0.690	7720.35	6.367	0.479	2.866
0.242	0.696	7971.28	6.426	0.495	2.807
0.247	0.713	8138.56	6.582	0.505	2.651
0.257	0.727	8473.14	6.715	0.524	2.518
0.260	0.731	8556.76	6.753	0.531	2.480
0.273	0.751	8975.01	6.930	0.557	2.295
0.280	0.766	9225.94	7.075	0.572	2.159
0.286	0.778	9476.87	7.187	0.588	2.046
0.298	0.795	9811.45	7.343	0.609	1.891
0.308	0.814	10146.02	7.514	0.630	1.719
0.313	0.827	10313.31	7.639	0.640	1.591
0.323	0.838	10647.89	7.742	0.661	1.492
0.336	0.854	11066.11	7.887	0.687	1.347
0.346	0.862	11406.48	8.014	0.707	1.219
0.351	0.875	11567.97	8.115	0.716	1.119
0.359	0.890	11818.90	8.214	0.733	1.020
0.374	0.906	12326.77	8.367	0.764	0.867
0.387	0.918	12738.99	8.479	0.790	0.754
0.402	0.931	13240.85	8.595	0.822	0.639
0.407	0.941	13408.14	8.692	0.832	0.541
0.422	0.952	13920.00	8.791	0.863	0.442
0.430	0.963	14160.94	8.889	0.879	0.344
0.440	0.969	14495.51	8.957	0.895	0.282
0.455	0.977	14997.38	9.021	0.931	0.215
0.468	0.982	15415.60	9.064	0.957	0.169
0.481	0.987	15833.82	9.114	0.982	0.119
0.484	0.992	16252.04	9.161	1.006	0.072
0.509	0.995	17533.96	9.188	1.040	0.045
0.516	0.997	17604.83	9.216	1.055	0.023
0.534	0.999	17550.34	9.228	1.091	0.001

MON 159

Y(CN)	D/DE	Y+	D+	Y/DELTA	DEDF
0.184	0.490	4463.84	6.353	0.316	6.621
0.184	0.492	4640.54	6.379	0.329	6.595
0.199	0.501	4768.33	6.498	0.337	6.476
0.207	0.518	4951.03	6.721	0.350	6.253
0.217	0.527	5194.62	6.836	0.368	6.138
0.222	0.544	5316.42	7.057	0.376	5.917
0.232	0.557	5560.01	7.232	0.393	5.741
0.237	0.563	5681.81	7.301	0.405	5.672
0.242	0.577	5803.60	7.485	0.413	5.489
0.242	0.577	5886.30	7.690	0.424	5.284
0.250	0.593	6002.09	7.811	0.441	5.163
0.260	0.602	6229.89	7.922	0.454	5.051
0.267	0.611	6412.59	8.131	0.471	4.842
0.278	0.627	6656.18	8.397	0.486	4.576
0.288	0.640	7143.37	8.561	0.506	4.413
0.311	0.684	7467.86	8.880	0.527	4.094
0.318	0.704	7630.55	9.131	0.540	3.842
0.326	0.717	7813.25	9.306	0.553	3.668
0.331	0.723	7955.04	9.385	0.562	3.586
0.346	0.750	8300.43	9.735	0.587	3.258
0.359	0.781	8604.92	10.130	0.609	2.844
0.367	0.793	8787.62	10.292	0.622	2.682
0.379	0.804	9092.11	11.435	0.643	2.339
0.392	0.828	9396.60	11.745	0.665	2.229
0.415	0.857	9944.66	11.119	0.764	1.855
0.425	0.866	10186.28	11.237	0.721	1.737
0.430	0.877	10310.07	11.361	0.730	1.593
0.440	0.889	10553.67	11.538	0.747	1.436
0.453	0.904	10856.16	11.725	0.768	1.249
0.463	0.911	11101.75	11.823	0.786	1.151
0.478	0.925	11467.14	12.004	0.811	0.970
0.488	0.941	11710.73	12.264	0.829	0.770
0.499	0.947	11954.33	12.287	0.846	0.680
0.506	0.955	12137.02	12.367	0.859	0.587
0.524	0.967	12563.32	12.543	0.885	0.433
0.539	0.972	12926.70	12.615	0.915	0.356
0.562	0.982	13476.76	12.745	0.954	0.229
0.575	0.986	13781.28	12.795	0.975	0.175
0.588	0.990	14065.77	12.843	0.997	0.136
0.603	0.993	14451.16	12.875	1.023	0.095
0.621	0.995	14877.45	12.907	1.053	0.066
0.633	0.996	15221.84	12.911	1.070	0.046
0.651	0.998	15608.22	12.915	1.105	0.018
0.669	0.999	16034.51	12.913	1.135	0.011

MON 162

Y(CN)	D/DE	Y+	D+	Y/DELTA	DEDF
0.185	0.435	3853.14	6.682	0.275	8.688
0.191	0.419	3854.32	6.443	0.278	8.927
0.191	0.425	3956.69	6.527	0.286	8.843
0.201	0.431	4059.07	6.650	0.293	8.740
0.212	0.454	4213.81	7.007	0.308	8.363
0.219	0.454	4417.37	6.982	0.319	8.388
0.224	0.462	4519.74	7.101	0.327	8.269
0.232	0.477	4673.30	7.339	0.338	8.031
0.242	0.478	4878.05	7.345	0.352	8.025
0.250	0.489	5031.61	7.511	0.364	7.859
0.257	0.508	5185.16	7.802	0.375	7.568
0.262	0.524	5287.54	8.059	0.382	7.311
0.273	0.541	5492.28	8.320	0.397	7.050
0.283	0.549	5697.03	8.439	0.412	6.931
0.293	0.571	5901.77	8.777	0.426	6.593
0.308	0.592	6204.89	9.106	0.449	6.264
0.321	0.618	6464.82	9.501	0.467	5.869
0.336	0.636	6771.94	9.781	0.489	5.589
0.354	0.666	7136.24	10.261	0.515	5.109
0.369	0.703	7437.56	10.801	0.537	4.549
0.384	0.711	7744.48	10.931	0.560	4.444
0.402	0.740	8102.76	11.372	0.585	3.998
0.415	0.760	8356.71	11.683	0.604	3.686
0.427	0.778	8614.64	11.954	0.622	3.416
0.438	0.794	8819.39	12.202	0.637	3.169
0.450	0.811	9075.32	12.460	0.656	2.909
0.466	0.833	9382.43	12.799	0.678	2.572
0.481	0.851	9740.74	13.078	0.704	2.292
0.494	0.865	9945.40	13.296	0.719	2.074
0.509	0.882	10252.60	13.554	0.741	1.816
0.522	0.905	10713.28	13.913	0.774	1.457
0.549	0.920	11271.58	14.144	0.800	1.226
0.567	0.935	11429.08	14.373	0.826	0.997
0.585	0.945	11788.29	14.520	0.857	0.810
0.605	0.959	12197.68	14.725	0.881	0.645
0.623	0.971	12760.72	14.929	0.922	0.441
0.644	0.982	13374.96	15.098	0.944	0.274
0.664	0.990	13989.19	15.209	1.011	0.161
0.722	0.994	14552.24	15.280	1.051	0.089
0.745	0.997	15012.92	15.316	1.085	0.054
0.765	0.998	15422.43	15.345	1.114	0.025

MON 160

Y(CN)	D/DE	Y+	D+	Y/DELTA	DEDF
0.191	0.332	2565.99	7.396	0.239	14.882
0.199	0.328	2668.22	7.301	0.248	14.889
0.199	0.315	2668.22	7.018	0.248	15.272
0.204	0.345	2736.37	7.685	0.255	14.405
0.217	0.344	2906.75	7.671	0.271	14.619
0.224	0.360	3008.98	8.028	0.280	14.243
0.229	0.364	3077.14	8.103	0.287	14.187
0.240	0.345	3213.45	7.697	0.299	14.593
0.247	0.387	3315.68	8.619	0.309	13.671
0.255	0.389	3417.91	8.680	0.318	13.610
0.270	0.416	3622.37	9.277	0.337	13.023
0.283	0.425	3792.75	9.474	0.353	12.817
0.295	0.459	3963.14	10.225	0.369	12.065
0.303	0.457	4065.37	10.177	0.379	12.113
0.316	0.487	4235.75	10.963	0.394	11.427
0.326	0.501	4372.06	11.172	0.407	11.118
0.339	0.517	4562.44	11.525	0.423	10.765
0.351	0.545	4712.83	12.099	0.439	10.191
0.369	0.569	4951.36	12.676	0.461	9.612
0.385	0.590	5223.98	13.150	0.486	9.140
0.407	0.631	5462.52	14.071	0.509	8.219
0.430	0.665	5769.21	14.813	0.537	7.478
0.445	0.701	5973.67	15.616	0.556	6.674
0.466	0.705	6246.28	15.715	0.582	6.573
0.481	0.727	6450.74	16.203	0.602	6.088
0.494	0.749	6621.13	16.691	0.617	5.599
0.509	0.766	6825.59	17.073	0.636	5.217
0.524	0.799	7030.05	17.799	0.655	4.491
0.544	0.819	7302.67	18.253	0.680	4.037
0.562	0.841	7541.20	18.735	0.702	3.555
0.582	0.858	7813.82	19.133	0.728	3.157
0.608	0.887	8154.99	19.428	0.759	2.665
0.626	0.894	8393.12	19.978	0.782	2.340
0.643	0.900	8631.66	20.652	0.804	2.238
0.659	0.918	8896.12	20.453	0.823	1.877
0.689	0.937	9247.65	20.804	0.843	1.404
0.704	0.946	9449.51	21.091	0.881	1.199
0.722	0.957	9687.04	21.331	0.902	0.919
0.740	0.966	9921.58	21.525	0.924	0.765
0.758	0.972	10165.12	21.654	0.947	0.634
0.778	0.977	10437.73	21.779	0.972	0.511
0.793	0.982	10642.20	21.893	0.991	0.397
0.811	0.985	10800.73	21.954	1.013	0.327
0.829	0.990	11118.27	22.057	1.035	0.237
0.844	0.992	11323.73	22.123	1.054	0.167
0.864	0.995	11599.35	22.276	1.081	0.112
0.890	0.997	11937.11	22.238	1.112	0.067
0.905	0.998	12141.56	22.255	1.131	0.035
0.928	0.999	12446.27	22.270	1.159	0.020

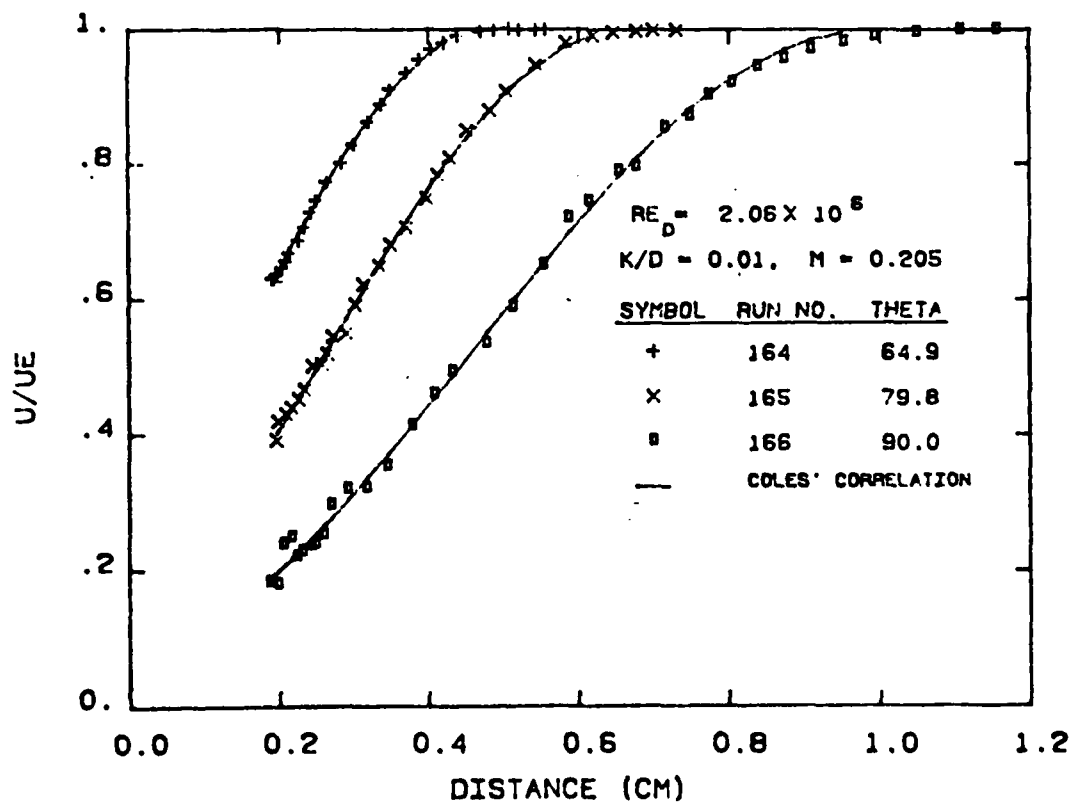
RUN 163

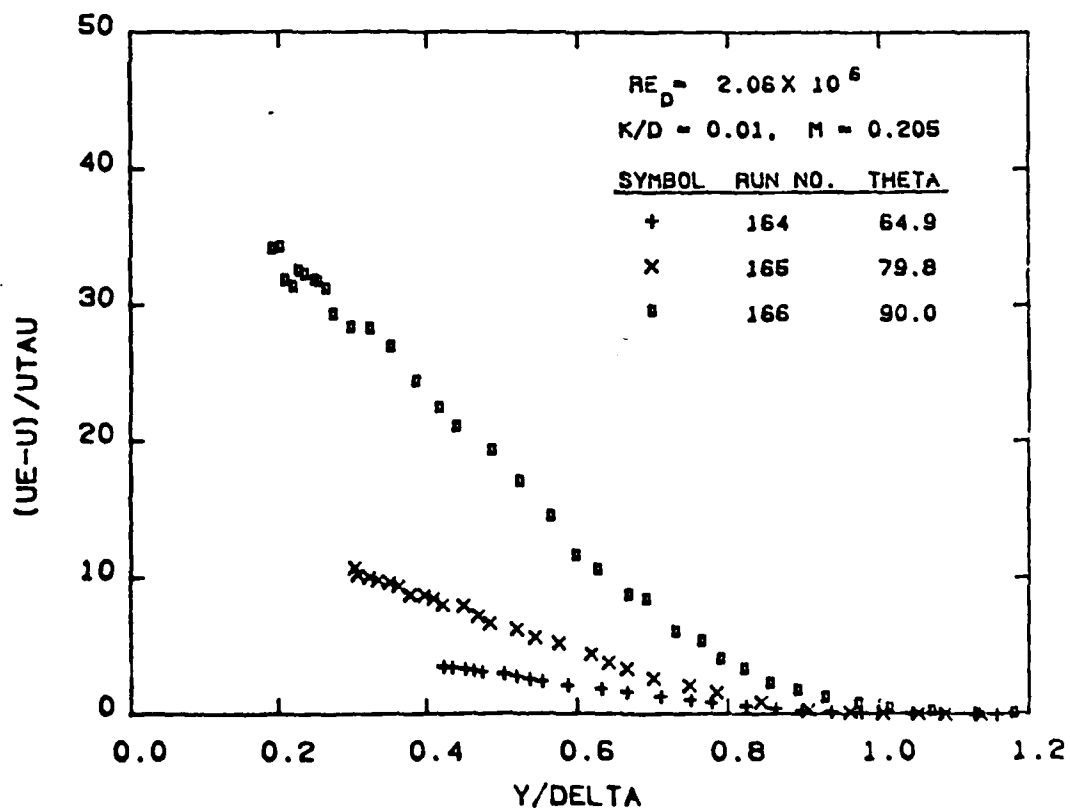
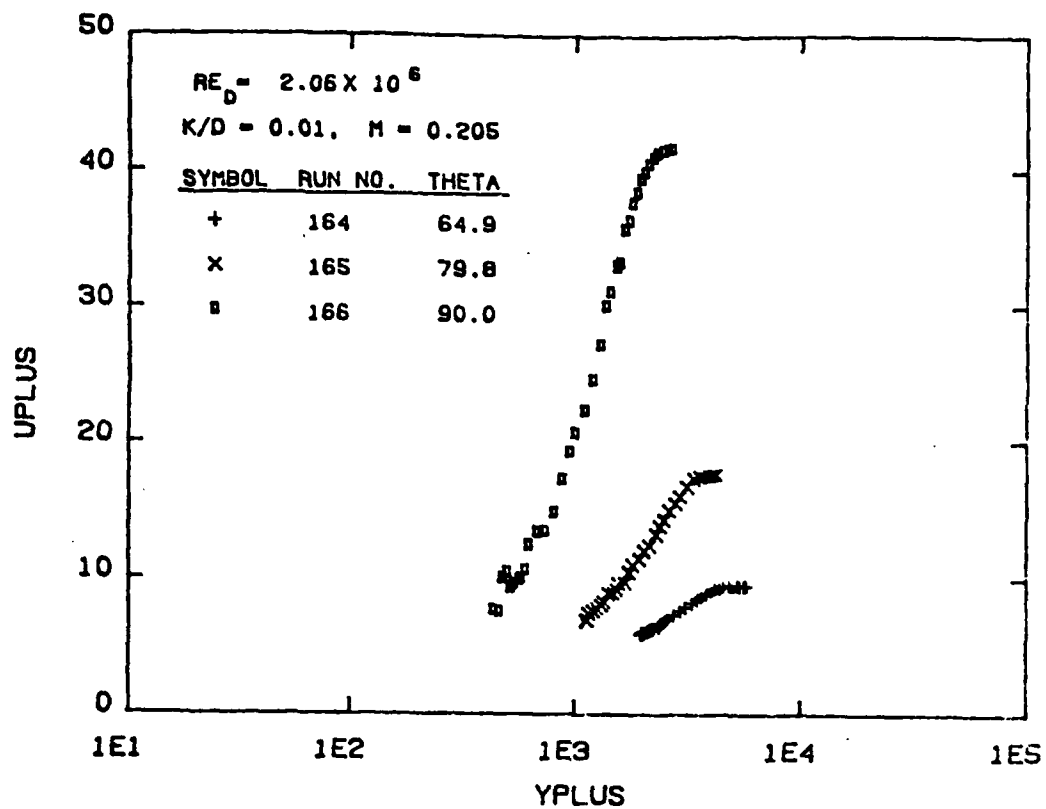
Y(CH)	U/DE	Y+	U+	Y/DELTA	UDEF
0.189	0.263	1912.64	7.723	0.177	21.878
0.199	0.242	2035.61	7.117	0.186	22.283
0.204	0.263	2067.10	7.735	0.191	21.666
0.214	0.245	2170.07	7.316	0.200	22.064
0.219	0.273	2221.55	8.031	0.205	21.370
0.224	0.223	2273.04	6.554	0.210	22.846
0.234	0.236	2376.00	6.949	0.219	22.412
0.245	0.283	2478.97	8.311	0.229	21.009
0.250	0.246	2530.46	7.291	0.234	22.109
0.267	0.323	2710.61	9.464	0.250	19.917
0.273	0.274	2762.14	8.057	0.255	21.344
0.283	0.292	2968.08	8.593	0.274	20.800
0.306	0.346	3090.79	10.167	0.286	19.233
0.323	0.347	3276.98	10.213	0.302	19.385
0.341	0.389	3457.16	11.437	0.319	17.963
0.361	0.382	3643.11	11.217	0.338	18.183
0.382	0.421	3869.05	12.375	0.357	17.026
0.415	0.452	4213.70	13.275	0.386	16.125
0.445	0.518	4512.61	15.253	0.416	14.168
0.478	0.539	4847.26	15.853	0.447	13.550
0.504	0.573	5104.61	16.441	0.473	12.560
0.537	0.608	5429.33	17.870	0.502	11.531
0.570	0.630	5773.97	18.695	0.533	10.711
0.600	0.682	6082.86	20.064	0.561	9.327
0.633	0.713	6417.53	20.548	0.592	8.453
0.666	0.750	6777.92	22.058	0.625	7.343
0.702	0.778	7112.57	22.673	0.656	6.528
0.735	0.818	7447.22	24.644	0.687	5.357
0.781	0.851	7920.58	25.024	0.730	4.377
0.824	0.887	8348.19	26.091	0.770	3.310
0.872	0.926	8827.30	27.232	0.816	2.169
0.916	0.940	9300.66	27.827	0.856	1.574
0.953	0.960	9843.65	28.232	0.892	1.149
1.024	0.984	10381.83	28.898	0.951	0.472
1.073	0.991	10870.52	29.142	1.003	0.219
1.123	0.990	11385.77	29.280	1.051	0.120
1.176	0.999	11902.10	29.376	1.103	0.028

RUN 163

Y(CH)	U/DE	Y+	U+	Y/DELTA	UDEF
0.417	0.160	651.99	25.587	0.212	155.875
0.478	0.165	747.23	30.565	0.242	154.896
0.516	0.225	806.76	41.810	0.262	143.651
0.552	0.219	862.31	40.658	0.280	144.804
0.586	0.213	917.87	39.567	0.298	145.895
0.626	0.240	977.39	44.516	0.317	140.946
0.674	0.307	1052.79	54.917	0.342	128.945
0.740	0.314	1155.97	58.151	0.375	127.310
0.788	0.354	1231.37	65.655	0.400	119.806
0.845	0.413	1326.41	76.572	0.430	108.690
0.897	0.439	1407.00	81.325	0.455	104.137
0.976	0.502	1525.02	93.012	0.495	92.449
1.040	0.557	1624.23	103.232	0.527	82.230
1.106	0.620	1727.41	115.073	0.561	70.385
1.207	0.690	1894.14	129.103	0.612	56.359
1.294	0.755	2021.01	140.737	0.656	44.724
1.431	0.834	2238.35	154.740	0.725	30.723
1.540	0.895	2437.73	166.782	0.791	18.679
1.697	0.945	2652.02	175.310	0.861	10.152
1.794	0.960	2802.82	175.162	0.909	6.300
1.891	0.965	2901.52	182.270	0.962	3.192
1.972	0.985	3085.60	185.455	1.000	2.006
2.064	0.994	3231.39	184.430	1.045	1.026
2.167	0.997	3360.16	184.879	1.099	0.583
2.305	0.998	3600.45	185.136	1.168	0.320
2.386	0.999	3727.43	185.320	1.209	0.141
2.476	1.000	3856.35	185.438	1.252	0.024

PHI	6.498E+01	7.986E+01	8.390E+01
RUN	164	165	166
RE	2.071E+06	2.092E+06	2.084E+06
M	2.036E-01	2.042E-01	2.053E-01
K/D	1.000E-02	1.000E-02	1.000E-02
UI	7.047E+01	7.086E+01	7.115E+01
UE	1.074E+02	1.105E+02	1.055E+02
WU	1.080E-05	1.070E-05	1.080E-05
RESID	4.600E-03	8.300E-03	1.460E-02
YMIN	1.913E-01	1.963E-01	1.887E-01
YMAX	3.513E-01	5.062E-01	7.755E-01
PI	5.070E-01	2.006E+00	6.720E+00
DO*	1.853E+01	1.710E+01	1.488E+01
E+	3.300E+03	1.840E+03	7.400E+02
DELTA	4.505E-01	6.447E-01	9.796E-01
CP	5.080E-02	1.540E-02	2.500E-03
D*	1.123E+01	6.227E+00	2.527E+00
DEL*	7.490E-02	1.660E-01	3.484E-01
THETA	5.250E-02	8.910E-02	1.399E-01
B	1.427E+00	1.863E+00	2.491E+00
BTHETA	5.240E+03	9.190E+03	1.370E+04
BETA	-1.018E-01	5.954E-01	9.906E+00





RUN 164

Y(CM)	U/UE	Y+	U+	Y/DELTA	UDEF
0.191	0.631	1989.21	6.035	0.425	3.529
0.196	0.636	2042.05	6.085	0.436	3.479
0.204	0.647	2121.30	6.190	0.453	3.374
0.209	0.658	2174.13	6.292	0.464	3.272
0.214	0.669	2226.97	6.403	0.475	3.162
0.227	0.688	2359.05	6.579	0.503	2.985
0.234	0.707	2438.31	6.760	0.520	2.804
0.242	0.730	2517.56	6.981	0.537	2.584
0.250	0.747	2596.81	7.146	0.554	2.418
0.265	0.775	2755.31	7.412	0.588	2.153
0.285	0.803	2966.65	7.682	0.633	1.882
0.300	0.830	3125.15	7.934	0.667	1.630
0.321	0.864	3336.49	8.261	0.712	1.303
0.339	0.890	3521.41	8.508	0.752	1.057
0.351	0.912	3653.50	8.720	0.780	0.844
0.372	0.937	3864.83	8.958	0.825	0.606
0.389	0.956	4049.75	9.146	0.864	0.418
0.405	0.972	4208.26	9.292	0.898	0.272
0.422	0.980	4393.18	9.375	0.938	0.189
0.440	0.991	4578.10	9.478	0.977	0.086
0.471	0.998	4895.10	9.547	1.045	0.017
0.488	1.000	5080.02	9.561	1.084	0.004

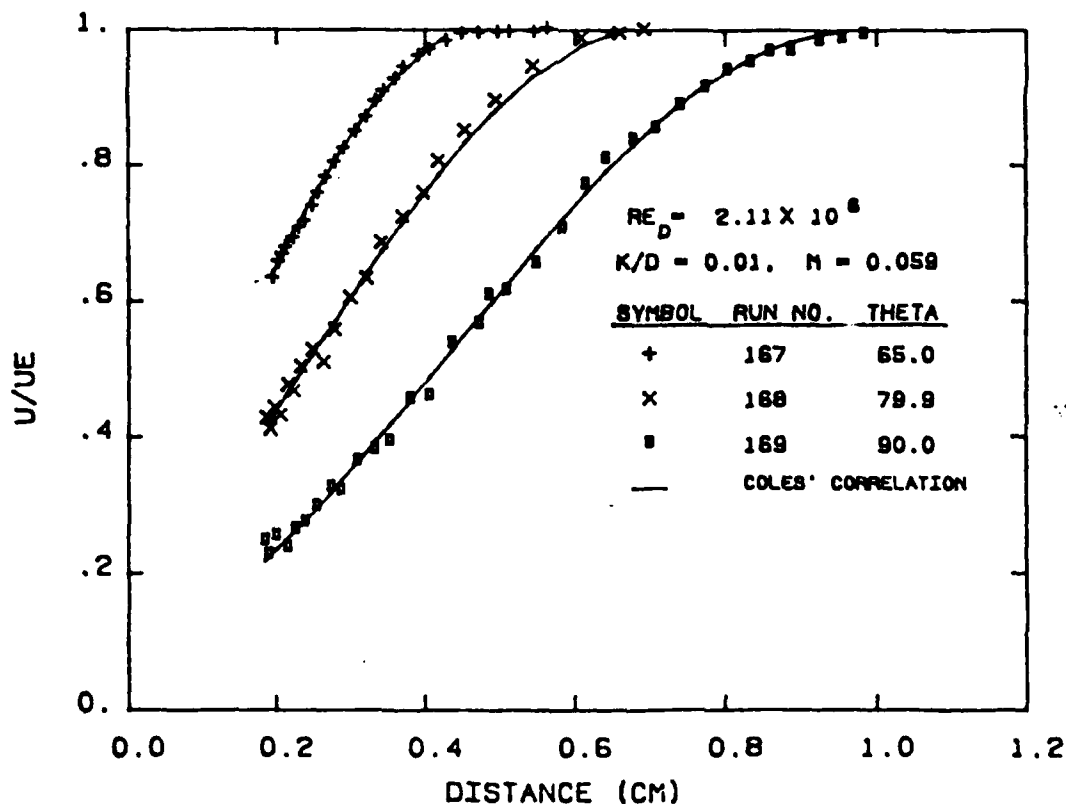
RUN 165

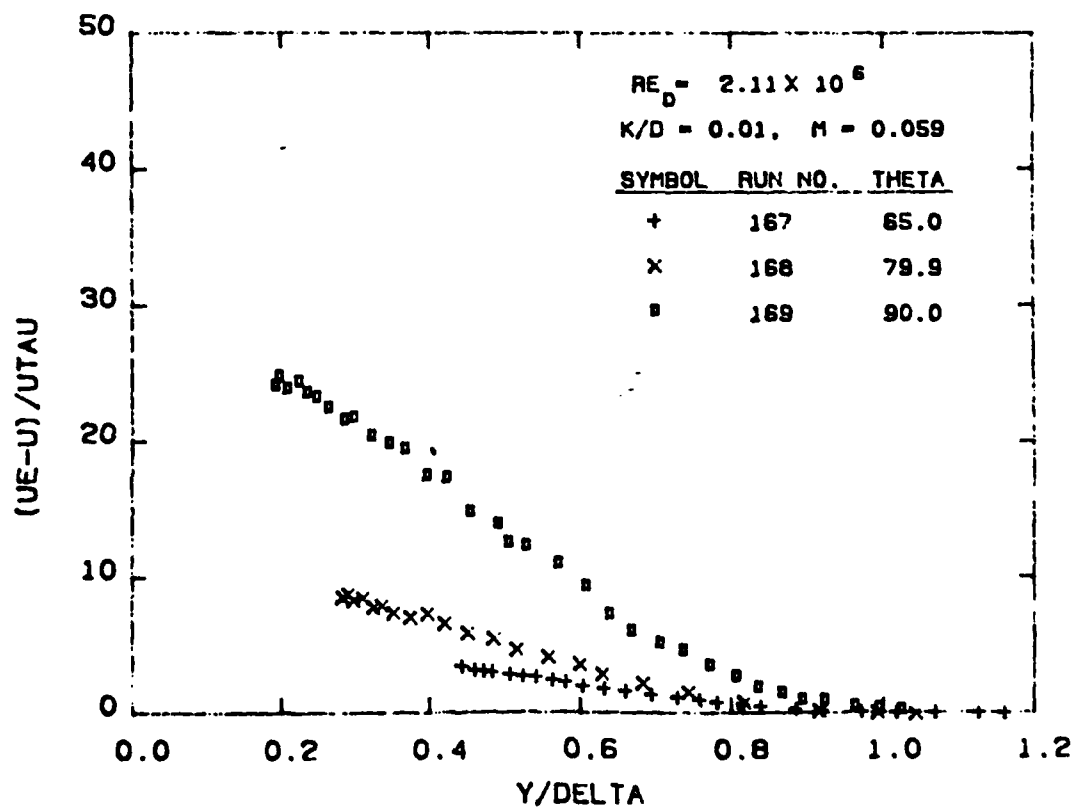
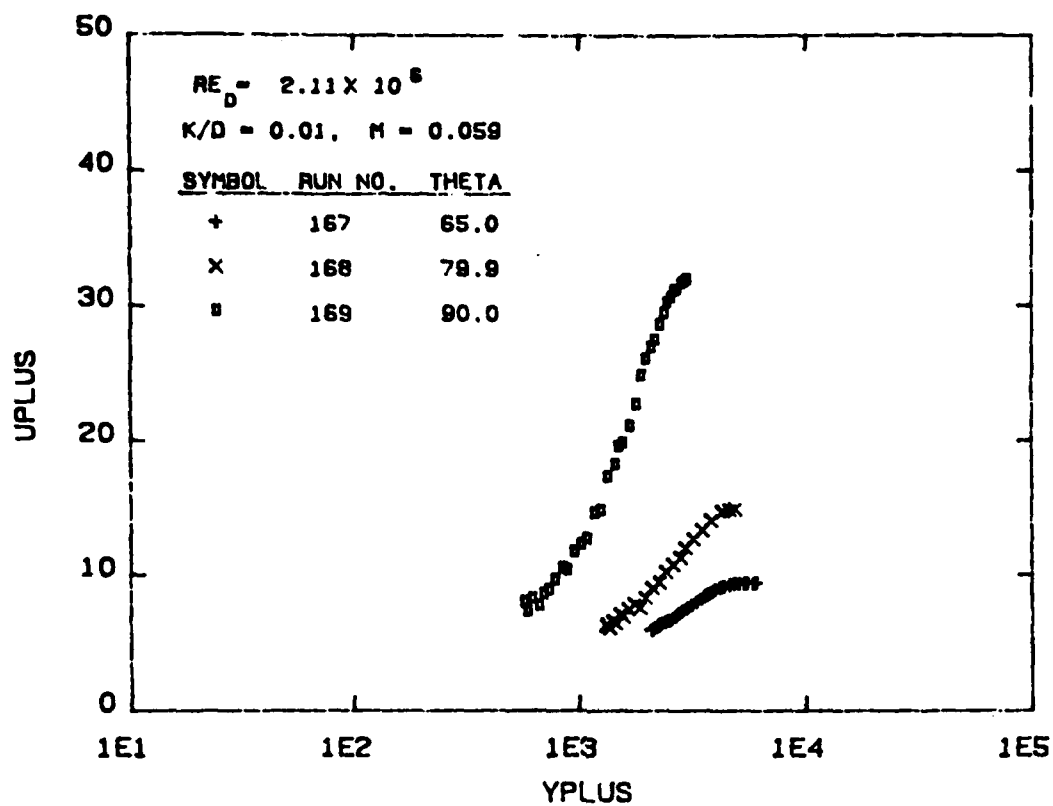
Y(CM)	U/UE	Y+	U+	Y/DELTA	UDEF
0.196	0.393	1142.55	6.976	0.305	10.773
0.199	0.421	1157.33	7.465	0.308	10.204
0.209	0.432	1216.45	7.663	0.324	10.006
0.217	0.441	1260.79	7.835	0.336	9.914
0.227	0.454	1319.91	8.060	0.352	9.688
0.234	0.468	1364.26	8.305	0.364	9.443
0.245	0.503	1423.38	8.922	0.379	8.826
0.257	0.506	1497.28	8.976	0.399	8.772
0.265	0.521	1541.62	9.244	0.411	8.505
0.273	0.546	1585.97	9.690	0.423	8.059
0.290	0.551	1689.43	9.778	0.450	7.971
0.303	0.593	1763.33	10.527	0.470	7.222
0.313	0.623	1822.46	11.059	0.486	6.690
0.336	0.650	1955.48	11.533	0.521	6.216
0.351	0.681	2044.17	12.096	0.545	5.653
0.372	0.707	2162.41	12.540	0.576	5.208
0.400	0.750	2325.00	13.306	0.620	4.443
0.415	0.785	2413.68	13.930	0.643	3.818
0.430	0.811	2502.37	14.389	0.667	3.360
0.453	0.851	2635.39	15.108	0.702	2.641
0.483	0.880	2812.76	15.626	0.750	2.123
0.506	0.909	2945.79	16.136	0.785	1.612
0.544	0.949	3167.50	16.840	0.844	0.909
0.585	0.982	3403.99	17.421	0.907	0.328
0.621	0.992	3610.92	17.606	0.962	0.143
0.648	0.997	3773.50	17.695	1.006	0.054
0.679	0.999	3950.87	17.729	1.053	0.020

RUN 166

Y(CM)	U/UE	Y+	U+	Y/DELTA	UDEF
0.189	0.183	441.54	7.640	0.193	34.124
0.199	0.180	465.31	7.538	0.203	34.226
0.207	0.240	483.14	10.008	0.211	31.756
0.217	0.250	506.91	10.423	0.221	31.341
0.224	0.222	524.74	9.254	0.229	32.510
0.232	0.229	542.56	9.553	0.237	32.211
0.245	0.237	572.28	9.906	0.250	31.858
0.250	0.240	584.16	10.021	0.255	31.743
0.260	0.254	607.93	10.592	0.265	31.172
0.270	0.298	631.70	12.445	0.276	29.318
0.293	0.321	685.19	13.416	0.299	28.348
0.318	0.323	744.62	13.491	0.325	28.273
0.346	0.355	809.98	14.842	0.353	26.922
0.379	0.415	887.24	17.316	0.387	24.448
0.410	0.462	958.55	19.303	0.418	22.461
0.433	0.495	1012.03	20.670	0.442	21.094
0.478	0.536	1119.00	22.396	0.488	19.368
0.514	0.590	1202.20	24.646	0.525	17.118
0.554	0.652	1297.28	27.234	0.566	14.530
0.588	0.721	1374.54	30.123	0.600	11.641
0.615	0.746	1439.91	31.158	0.628	10.606
0.656	0.791	1534.99	33.038	0.670	8.726
0.679	0.798	1588.47	33.325	0.693	8.439
0.717	0.856	1677.61	35.755	0.732	6.009
0.750	0.873	1754.87	36.440	0.766	5.324
0.775	0.904	1814.29	37.737	0.792	4.027
0.806	0.922	1885.61	38.509	0.823	3.255
0.839	0.946	1962.86	39.516	0.856	2.248
0.875	0.958	2046.06	40.016	0.893	1.748
0.910	0.972	2129.25	40.598	0.929	1.165
0.953	0.983	2230.28	41.061	0.973	0.703
0.994	0.991	2325.36	41.388	1.015	0.376
1.050	0.996	2456.10	41.609	1.072	0.155
1.108	0.999	2592.78	41.736	1.131	0.028

PHI	6.500E+01	7.999E+01	9.005E+01
RUN	167	168	169
RE	2.081E+06	2.125E+06	2.102E+06
N	5.990E-02	6.040E-02	5.940E-02
K/D	1.000E-02	1.000E-02	1.000E-02
UI	2.078E+01	2.077E+01	2.042E+01
UE	3.207E+01	3.257E+01	3.038E+01
NU	3.160E-06	3.090E-06	3.070E-06
RESID	6.200E-03	1.450E-02	1.400E-02
YMIN	1.836E-01	1.887E-01	1.862E-01
YMAX	3.716E-01	4.961E-01	7.424E-01
PI	4.888E-01	1.407E+00	4.744E+00
DO*	1.861E+01	1.758E+01	1.556E+01
K+	3.400E+03	2.240E+03	9.750E+02
DELTA	4.428E-01	6.658E-01	9.610E-01
CF	5.350E-02	2.210E-02	4.300E-03
U*	3.399E+00	2.185E+00	9.470E-01
DEL*	7.460E-02	1.611E-01	3.241E-01
THETA	5.230E-02	9.000E-02	1.401E-01
B	1.428E+00	1.790E+00	2.313E+00
BTHETA	5.300E+03	9.470E+03	1.390E+04
BETA	-9.601E-02	4.078E-01	6.198E+00





RUN 167

Y(CM)	D/DE	Y+	D+	Y/DELTA	UDEF
0.184	0.631	1975.55	5.950	0.415	3.484
0.196	0.637	2112.17	6.008	0.443	3.426
0.204	0.660	2194.14	6.228	0.461	3.205
0.209	0.672	2248.79	6.340	0.472	3.093
0.214	0.682	2303.44	6.433	0.484	3.001
0.224	0.695	2412.73	6.560	0.507	2.873
0.232	0.711	2494.71	6.705	0.524	2.729
0.240	0.720	2576.68	6.790	0.541	2.644
0.250	0.742	2685.98	7.003	0.564	2.431
0.257	0.761	2767.95	7.182	0.581	2.251
0.267	0.784	2877.25	7.399	0.604	2.035
0.280	0.807	3013.87	7.617	0.633	1.817
0.293	0.827	3150.49	7.803	0.661	1.630
0.308	0.852	3314.44	8.037	0.696	1.396
0.323	0.873	3478.38	8.240	0.730	1.194
0.336	0.897	3615.00	8.464	0.759	0.970
0.346	0.912	3724.30	8.602	0.782	0.831
0.361	0.929	3888.25	8.766	0.816	0.668
0.372	0.947	3997.54	8.931	0.839	0.502
0.392	0.965	4216.14	9.101	0.885	0.332
0.407	0.974	4380.08	9.188	0.920	0.245
0.430	0.986	4626.00	9.306	0.971	0.128
0.450	0.997	4844.60	9.405	1.017	0.028
0.473	0.998	5090.52	9.413	1.069	0.021
0.499	1.000	5363.76	9.429	1.126	0.005
0.547	1.000	5882.92	9.431	1.235	0.003

RUN 168

Y(CM)	D/DE	Y+	D+	Y/DELTA	UDEF
0.189	0.429	1334.55	6.398	0.283	8.506
0.194	0.413	1370.47	6.159	0.291	8.746
0.199	0.445	1406.40	6.626	0.299	8.279
0.207	0.433	1460.28	6.461	0.310	8.444
0.217	0.479	1532.13	7.141	0.325	7.764
0.224	0.470	1586.01	7.000	0.337	7.905
0.234	0.506	1657.86	7.535	0.352	7.370
0.250	0.530	1765.63	7.904	0.375	7.001
0.265	0.512	1873.40	7.633	0.398	7.272
0.280	0.561	1981.17	8.358	0.421	6.547
0.300	0.607	2124.86	9.042	0.451	5.862
0.323	0.635	2286.52	9.465	0.486	5.440
0.344	0.688	2430.21	10.255	0.516	4.650
0.372	0.725	2627.79	10.810	0.558	4.095
0.400	0.761	2825.37	11.343	0.600	3.562
0.420	0.808	2969.06	12.044	0.631	2.861
0.455	0.853	3220.53	12.710	0.684	2.195
0.496	0.898	3507.91	13.378	0.745	1.527
0.544	0.948	3849.18	14.124	0.818	0.781
0.610	0.990	4316.19	14.752	0.917	0.152
0.661	0.998	4675.42	14.874	0.993	0.030

RUN 169

Y(CM)	D/DE	Y+	D+	Y/DELTA	UDEF
0.186	0.249	574.31	7.978	0.194	24.102
0.191	0.228	589.98	7.327	0.199	24.754
0.201	0.256	621.32	8.226	0.210	23.854
0.217	0.240	668.34	7.698	0.225	24.382
0.227	0.266	699.68	8.525	0.236	23.556
0.240	0.276	738.85	8.859	0.249	23.221
0.255	0.300	785.86	9.622	0.265	22.458
0.275	0.328	848.54	10.514	0.286	21.566
0.288	0.323	887.72	10.359	0.299	21.721
0.311	0.365	958.23	11.722	0.323	20.358
0.334	0.382	1028.75	12.257	0.347	19.823
0.354	0.395	1091.43	12.672	0.368	19.409
0.382	0.457	1177.62	14.651	0.397	17.430
0.407	0.462	1255.97	14.823	0.424	17.258
0.438	0.540	1349.99	17.318	0.455	14.762
0.473	0.568	1459.68	18.209	0.492	13.871
0.486	0.610	1498.86	19.573	0.506	12.507
0.509	0.618	1569.37	19.825	0.529	12.256
0.549	0.657	1694.74	21.090	0.572	10.990
0.585	0.709	1804.43	22.734	0.609	9.347
0.615	0.774	1898.45	24.834	0.640	7.247
0.643	0.812	1984.63	26.061	0.669	6.019
0.679	0.840	2094.33	26.932	0.706	5.149
0.709	0.857	2188.35	27.489	0.738	4.592
0.742	0.891	2290.20	28.584	0.773	3.497
0.775	0.917	2392.06	29.420	0.807	2.660
0.803	0.943	2478.25	30.243	0.836	1.838
0.834	0.955	2572.27	30.623	0.868	1.457
0.859	0.970	2650.62	31.123	0.894	0.958
0.887	0.971	2736.81	31.165	0.923	0.915
0.925	0.986	2854.33	31.645	0.963	0.435
0.956	0.991	2948.35	31.777	0.995	0.304
0.984	0.995	3034.54	31.928	1.024	0.153

END

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